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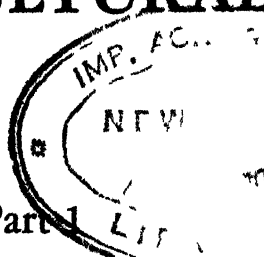
JANUARY 1942

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXVII



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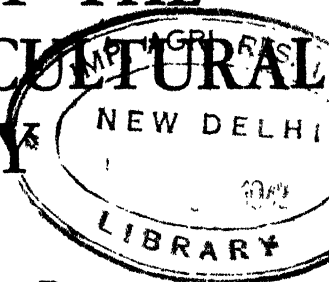
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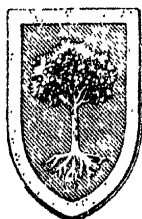
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FEBRUARY 1942

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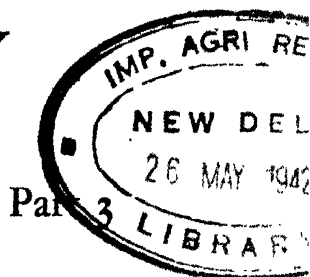
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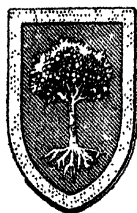
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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXVII



January 1942



THE SECRETARY'S PAGE.

PROGRAMME, 1942.

THE Annual Meeting to receive the year's report and accounts will be held on Tuesday, February 17, at 3 P.M., on the Society's premises.

Flower Shows will be held monthly, circumstances permitting, the first Show being on the occasion of the Annual Meeting on Tuesday, February 17 (12 noon to 6 P.M.), and Wednesday, February 18 (10 A.M. to 4.30 P.M.). Announcements of Shows and other activities will be found on this page and will be circulated to the Press.

At the Gardens at Wisley special emphasis is being laid on food production, and the following programme of demonstrations has been arranged :—

Vegetable Garden.

- | | |
|--------------|--|
| March 4, 5 | . Outdoor seed bed and seed sowing. 2-4 P.M. |
| May 13, 14 | . Control of vegetable pests and diseases. 2-4 P.M. |
| May 27, 28 | . Thinning, transplanting and successional cropping.
2-4 P.M. |
| Sept. 16, 17 | . Harvesting and storing. 2-4 P.M. |
| Oct. 7, 8. | . Digging, trenching, manuring and composting.
2-4 P.M. |

Fruit Garden.

- | | |
|-------------|--|
| April 1, 2 | . Spring spraying of fruit trees. 2-4 P.M. |
| July 15, 16 | . Summer pruning of fruit trees. 2-4 P.M. |
| Nov. 4, 5 | . Planting fruit trees and Roses. 2-4 P.M. |
| Dec. 2, 3 | . Pruning of fruit trees. 11 A.M.-1 P.M. |

Flower Garden.

March 11, 12 . Rose pruning and pruning of shrubs. 2-4 P.M.

June 3, 4 . Summer pruning of shrubs. 2-4 P.M.

Aug. 19, 20 . Vegetative propagation of plants. 2-4 P.M.

In the case of bad weather at the times of the demonstrations, arrangements will be made for a talk illustrated by lantern slides. Fellows and their friends are asked to notify the Director, R.H.S. Gardens, Wisley, nr. Ripley, Surrey, of their intention to attend.

In addition to the demonstrations, the trials of vegetables will include Carrots (July sown), Kales and Spring Sprouting Broccoli, Spring sown Cabbage (including earliest and latest varieties), and, in special demonstration plots, autumn sown Spinach, autumn sown Cabbage, outdoor Tomatos and Onions, and Potatos of quality.

PUBLICATIONS.

The Royal Horticultural Society's Diary is now published and will make a useful seasonal gift. The selling price, including Purchase Tax, is as follows :—

In Pluviusin with back loop and pencil, 3s. 4d. post free.

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The Vegetable Garden Displayed has maintained its popularity, and the first and second impressions and the reprint of the second impression have been sold out. The third impression is now available at the same price, namely, 1s. 3d. plus 3d. postage.

SEED AND PLANT DISTRIBUTION.

Circulated with this JOURNAL are two enclosures in reference to the distribution of plants and seeds—an application form and a list of what is available. As the staff is of necessity working shorthanded it is hoped that all those who desire to make applications for seeds and plants will do so as quickly as possible; and further, owing to the shortage of boxes and paper, it will be a considerable help towards the distribution in 1943 if as many members as possible would return their boxes if in good condition. Fellows will be reminded again of this request in the March number of the JOURNAL.

SUBSCRIPTIONS, 1942.

The third enclosure is one of great importance, namely, the reminder that the subscriptions to the Society fall due on January 1. It must be pointed out that in order successfully to carry on the Society's work, especially with regard to its food production programme and the trials at Wisley, the continued support of the Fellows and Associates is required. It is also pointed out that it is proposed to hold a series

of Flower Shows on the same lines as last year at regular monthly intervals, commencing from the Annual Meeting, so that the privileges of the Fellows are being maintained as far as possible. Fellows are again reminded that the staff is shorthanded and their work would be considerably lightened if subscriptions could be paid as soon as possible and all changes of addresses or of bankers notified.

RED CROSS POSTAL AUCTION SALE.

Notice was given in the December number of the intention of the Society to hold another Sale on behalf of the Red Cross and St. John Fund. The Organizing Committee has now met and is organizing a Sale consisting of two Sections as follows :—

Section I.—Horticultural sundries and other articles connected with country pursuits such as tennis and other garden games, and sporting requisites such as guns and fishing rods.

The above will be new goods given by the Trade as the result of an appeal to be made by the Sundries Sub-Committee of the Red Cross Horticultural Committee.

Section II.—Horticultural and botanical books and prints, and books dealing with botanical exploration, sport, entomology, ornithology and other country pursuits.

An appeal is now made to the Fellows and Associates of the Society to search their libraries for books of interest and for prints which may be included in the Sale in Section II.

The closing date for receiving offers of books and prints, etc., is January 16. It is hoped that there will be a very generous response, as there was on the previous occasion. At the former Sales the books, prints, etc., realized over £2,300. It is hoped that this figure will again be equalled, if not exceeded.

EXAMINATIONS.

The closing date for the Society's General Examination is January 13, and that for the National Diploma in Horticulture, February 1.

WISLEY IN JANUARY.

FOR plants in flower at this season we shall chiefly have to depend upon the glasshouses, especially the Half-hardy and Temperate houses, but even so early in the year there are flowers to be found in the open if one knows what to seek and where to look. The Algerian *Iris unguicularis* (*stylosa*) in several forms under the southern wall of the laboratory is one example ; others are bushes of the sweet-scented golden-yellow *Hamamelis mollis*, probably the pale pink clusters of

Viburnum fragrans, if the weather is not too unkind, in Seven Acres and the Award of Merit garden, and the equally fragrant *Mahonia japonica* in the Wild garden, so suitable for this semi-shaded position and soil rich in leaf-mould. In the beds beside the Alpine house there will be species of Crocus—*C. aureus*, *C. chrysanthus* and *C. Sieberi*, for example—more especially in the latter part of the month, and on the western side of the house the interesting hybrid *Helleborus nigercors* (*niger* × *corsicus*).

In the Half-hardy house the deep blue flowers of *Lithospermum rosmarinifolium* will be one of the most noticeable features, and on the opposite bank the grey foliage of *Achillea ptarmicaefolia* and *Helichrysum discolor*. A little higher up are the butter-yellow umbels of the South African bulb *Cyrtanthus Mackenii* var. *Cooperi* (*C. lutescens*) and climbing over one of the supports of the house is the attractive *Clematis cirrhosa* with pendent white flowers produced from November onwards. At the northern end the red and yellow Abutilons continue to produce a succession of their bell-shaped flowers, both forms excellent for their continuous flowering.

A variety of shrubs is in bloom now in the larger Temperate house. Acacias, Camellias and Epacris are particularly evident, with examples of *A. alata*, *A. Baileyana* with its delicate-looking leaves and masses of tiny yellow flowers, as well as other species; the single form of *C. reticulata*, of Chinese origin, *C. japonica* var. *magnoliaeflora*, and 'White Swan,' the rose-like double blooms of *C. maliflora*, and the lovely pink *C. saluenensis* also from Western China; the slender stems of *E. ardentissima* densely hung with reddish-crimson flowers, the white *E. impressa* var. *ceraeflora* and the miniature rosettes of the double-flowered *E. purpurascens*, var. *flore-pleno*. Some other showy plants are a large bush of *Erica canaliculata* which annually clothes itself with a multitude of small white bells, the uncommon Chinese evergreen *Gordonia chrysandra* bearing white flowers like some Camellia species, *Correa speciosa* var. *Harrisii*, a small bush richly ornamented by a profusion of tubular rosy-red blooms, the orange spikes of *Nicodemia* (*Buddleja*) *madagascariensis* and the white, more slender and very fragrant racemes of *B. asiatica*, a species found wild from India to Formosa and the Philippine Islands. *Loropetalum chinense* is gay with creamy-white, Hamamelis-like flowers, and two interesting though not so showy evergreen plants are the aromatic Australian *Doryphora Sassafras* and the lowlier *Sarcococca saligna* var. *angustifolia*, native of Nepal and the western Himalaya. On the eastern side of the house are climbing two species of *Hibbertia*, *H. dentata* and *H. volubilis*, both producing yellow flowers over a lengthy period.

Going now to the Alpine house we may not find many plants actually flowering, save perhaps for the enduring Candytufts, *Iberis semperflorens* and *I. saxatilis*, and the earliest Saxifrages such as *S. Kellereri*, but there are a number of grey-foliaged plants worthy of notice. They include the Spanish *Andryala Agardhii*, *Artemisia brachyphylla* and *A. pedemontana*, *Helichrysum plicatum* and mat-

forming *H. frigidum*, and the New Zealand relative of the Edelweiss, *Leucogenes Leontopodium*, while the persistent silvery bracts of *Acantholimon venustum* likewise attract attention. Such plants are most appreciated in the dull months of the year and deserve their place even without flowers.

Another group which comes into its own when other trees and shrubs are leafless are the Conifers, especially the grey and golden varieties. It should be remembered that these include dwarf forms fit only for the rock garden as well as shrubs and tall trees, and this is the proper season at which to make a choice of varieties when new planting is under consideration. The rock garden contains a considerable number of the dwarf kinds, as does the Heath garden, while the larger types are grouped together opposite the glasshouses or planted as specimens in the Pinetum. There are also good examples of *Chamaecyparis (Cupressus) pisifera* var. *plumosa*, *Sciadopitys verticillata*, *Picea Smithiana*, *Cedrus atlantica* var. *glauca*, and others in the Wild garden.

The winter months, so long as weather permits, is also the time for planting new trees and shrubs, or for rearranging and transplanting those unsuitably placed. Perhaps the periods October–November and February–April are the best for this work, but on a light soil like that at Wisley it is possible to plant at almost any time unless the ground is waterlogged or frozen. New planting work can be seen in the Wild garden, Pinetum, Howard's Field, Battleston Hill, and in other parts; much of it is necessary to find room for young plants which require moving from the nursery or from too crowded positions to their permanent places. Particular attention should be paid to their surroundings in relation to the individual shrub's requirements and period of beauty, ample space should be allowed for future development, and the important points of adequate staking, tying, and a permanent label should be remembered.

THE WAR-TIME KITCHEN GARDEN.

FOR many months now, each issue of the JOURNAL has contained an article on the management of the kitchen garden at that time of the year. It cannot be pretended that these articles are very closely appropriate to the season, because the notes have to be written and proofs corrected some considerable time before the copies are finally in the hands of our readers. So the advice given has to be somewhat generalized, and a spell of frost or drought towards the end of the month may make some of the recommendations look foolish. Moreover, the instructions for one year's work in the vegetable garden cannot be very different from those given in the year before, and by this time it may be hoped that every member of the Society who desires to be reminded of the routine of work has provided himself

with *The Vegetable Garden displayed*, where the plain, straightforward detail of vegetable-growing is set out. We shall therefore in the coming year no longer repeat the old story, which after all is at the present time being very competently dealt with by the daily and weekly Press. Instead we shall direct ourselves more particularly and perhaps in more detail to the problems of the private garden owner. He has had dinned into him the importance of Potatoes, the shortage of Carrots and Onions, the value of the vitamins that various green salads can provide, but he can learn a little more of how to make his garden the source of an attractive dietary. So many of our garden owners live in the country, and the country resident comes off indifferently in the rationing organization. He, or more generally she, cannot look round the shops to see what unrationed goods may be obtainable at a reasonable price, very often cannot get to the shop at all, but has to take whatever meat the purveyor with whom she is registered can send, without choice of either kind or quality. Such things as fish and "offals," cooked meats or such flavoury commodities as kippers or Finnan Haddies all seem to become arrested nearer the centre by the caterers who can buy in large quantities. In our earlier days the exponents of what then was called "political economy" used to dilate on the text that would-be buyers under any disability like distance could satisfy their needs only by paying a higher price; consequently the country dweller goes without when a fixed price is decreed. What an illuminating textbook of practical illustrations of the old economists' principles could be drawn up from the experiences of this and the former war—"How a minimum wage becomes a maximum"—"How a maximum price becomes the universal minimum"—"How bad money drives good money out"! Nor can the country dweller mitigate the situation by going out for a meal; the nearest hotel may be five miles away; and petrol is like whisky, to be reserved only for necessary occasions. But to return to our immediate business: the one advantage the country dweller has lies in the garden and its liberal supply of fresh vegetables.

Since this is the season when the gardener is considering the seed catalogues, it may be convenient to discuss the selection he or she should make, assuming that both space and labour are limited. There are also a few less common vegetables of which seed is still procurable; they are worth trying as bringing a little variety and quality into the garden produce, even if they are not strictly economic in the amount of food they will yield per square yard.

The country has now fully realized the necessity of increasing the supplies of home-grown food; the shortage of fresh vegetables and fruit in the shops has impressed even the townsman with the fact that many of our supplies have previously been imported from abroad. Those who normally grow vegetables have already increased the area under cultivation, and many people who have never attempted to do so before are now undertaking this form of gardening. The regular growers know their routine; professional gardeners are familiar with

the work to be done ; allotment holders are receiving plenty of help and advice through local societies and the Press ; so that it is proposed that the monthly reminders in the JOURNAL shall be designed chiefly to help those people who, knowing something of gardening in general, have not previously grown useful crops, or those who have had vegetables grown in their gardens under the supervision of a skilled man yet may, when he is called away to other duties, find themselves unfamiliar with the times at which operations have to be carried out to produce the results to which they are accustomed. It is one thing to go round the kitchen garden and say, " About time to get the Carrots in, isn't it ? " knowing that the person in charge will not take this as an order but will use his own judgment born of long experience, and quite another to have a raw youth inquire, " When do I sow the Carrots, sir ? "—and to be able to give a firm answer.

Many people who used to bring on bedding plants in frames may have given up this practice for the time being and have frames standing empty which they would like to make use of, and there may also be space available in a greenhouse ; a section each month will be devoted to the cultivation of vegetables under these conditions. It is also proposed to give briefly the crops that can reasonably be expected to be available each month. It is hoped in this way to be of assistance to the private growers who are willing and can make a very useful contribution to the nation's larder, even if they only supply the wants of their own family and dependants. Vegetables must now be regarded not merely as adjuncts to the main dish, but sometimes as the main dish itself.

JANUARY.

The Seed List.—Anyone who grew vegetables last year will have had some experience of which crops do best on his ground and which give the most satisfactory yield for the household's requirements. Plans will, therefore, have been made for this year's planting. No time should be lost in ordering the seeds that will be required. Others may be undertaking the cultivation of vegetables for the first time ; hopes are apt to outrun possibilities, and if one has had no experience it is not always easy to visualize the amount of space that will be occupied by each crop. If the ground available is limited, plan carefully, bearing in mind such points as the following.

The Potato supply of this country has always been grown here and the area under cultivation has been much increased ; if there is a shortage it will be due to adverse weather conditions or disease ; the professional grower is in a better position to deal with these troubles than the amateur : therefore do not plan to grow Potatos unless there is plenty of room ; better use can be made of the ground by sowing vegetables which are more difficult or more expensive to buy. Onions, on the other hand, have been almost entirely imported, and these sources of supply being now cut off, it is unlikely that there will be anything like the normal amount available in the shops. Onions are

so useful for flavouring and take up comparatively little room, so that some effort should be made to produce them at home; even if the bulbs do not reach exhibition size they will be most welcome in the kitchen.

Some of the Cabbage family take a good deal of space, and such things as Brussels Sprouts and Cauliflowers want plenty of air round them; it is no good trying to grow them if the only place available is the front of the herbaceous border, for the results will only be disappointing; but Cabbages, Savoys and Kales are easier to accommodate in a small plot. Cabbages can be sown at various times of the year, using suitable varieties; the most important crop for the gardener with limited space is the one which matures in April and May, the time when vegetables are scarcest. Runner Beans are a useful crop which presents few difficulties, but if the soil is normally a dry one French Beans may do better as they tolerate drier conditions; also they do not need staking. It sounds delightful to produce one's own Haricot Beans; one ounce of seed will produce about seventy-five plants; these should be grown in rows 2 feet apart, the plants being 9 inches apart in the rows; the yield will not be more than 3 lbs. of dried Beans: work out the arithmetic and see if there is space available to get a large enough crop to be worth while before trying them. Anyone who wants to store food rich in protein would probably do better to grow Peas, such as 'Harrison's Glory.'

Deep soils produce the largest root crops; if the depth of good soil is not great, choose the shorter-growing types such as round Beet and Shorthorn Carrots.

Where frames are available, salads, Carrots, etc., can be brought on early, and Ridge Cucumbers can easily be grown in them during the summer months. If there is a greenhouse, seed can be raised for planting out later—for instance, Onions, Leeks, Marrows, Tomatos, etc.—and Tomato plants can be grown there to provide fruit earlier than that produced out of doors.

Above all, when making up the seed list no one should be misled by advice given to growers with quite different requirements; the likes and dislikes of the household which is to consume the produce should be considered: it is no good growing the best Parsnips in the country if no one wants to eat them. Plan wisely: seed is scarce and should not be wasted; for most people, time also is scarce and should not be wasted either. Very early sowings made in the hope of a specially early crop should not be attempted: it is a risky business at best, and not advisable when seed must be used economically.

Work to be done.—It is best to dig in autumn if possible, but it is not too late even now if the work has not been completed, and where fresh land has become available it can be got into good condition in time for the spring sowing. But no attempt should be made to dig in unsuitable weather, either very wet or when the ground is frozen.

Crops available from the garden in January: Brussels Sprouts, Spinach Beet, Winter Cabbages, Savoys, Artichokes, Parsnips, Leeks,

Celery. *From store*: Beets, Carrots, Onions, Potatos, Shallots, Swedes, Turnips, Haricot Beans.

The Fruit Garden.—Weather conditions at this time of the year often prevent the carrying out of seasonal work in the open garden, and on such occasions the opportunity should be taken to attend to the needs of wall trained trees. If the winter pruning of Morello Cherries and Peaches and Nectarines has been delayed, get this done as soon as possible; Peaches and Nectarines will soon be moving into growth. The principle in pruning these three fruits is the same. As much as possible of the old wood is cut out to be replaced with the shoots made during the past season. In the case of Morello Cherries, space the shoots about two inches apart. Always train the shoots in one direction and do not allow them to cross. Look over all the ties on the trees, particularly those securing the main branches to the trellis, and where necessary replace old ties with new ones. This attention will often save breakages in the summer when the weight of the fruiting branches would snap weak ties.

The top soil on wall borders becomes 'worn out' in time and is best replaced every third or fourth year. Skim off the top two or three inches, being careful not to injure the surface roots. Prick up the exposed surface and replace the old soil with some well decayed turf (chopped up), to which has been added bone meal and wood ashes. Add some chalk or mortar rubble to the soil for stone fruits; a shortage of calcium will give rise to stoning troubles.

Protect Fig trees during severe weather by covering the border with straw and laying some hurdles or mats against the front of the trees. Only employ the hurdles or mats during very hard weather and remove them when conditions permit.

Examine the fruit store at regular intervals and remove for immediate use any fruit which shows the slightest symptoms of being attacked by storage rot.

Finish the pruning and spraying of trees in the open garden as soon as possible, and if further planting has yet to be done, complete it when the soil is friable and not sticky.

Ground to receive Strawberries this spring should now be made ready in order to allow the soil to settle down before planting time comes. Bastard trench the ground, placing a good layer of farmyard manure just below the first spit of soil. Do not bury the manure deeply; three to four inches below the surface is sufficient. If the soil is heavy employ long strawy manure if such is available; the long straw assists in aeration.

In the late Vinery any bunches still to be cut should now be removed and stored in a dry airy room. This will allow the late Vines to be pruned before the sap commences to move. Clean the rods and spray with a tar oil wash at 5 per cent. Wash down the house, finally whitewashing the brickwork. Continue to damp down the early Vinery, shutting the house down after the second damping, which is done early in the afternoon, and gradually increase the temperature by another 5 degrees as the buds develop.

AUGUSTINE HENRY.

1857-1930.

By SIR FREDERICK MOORE, F.L.S., Sc.D., V.M.H.

THE French Missionaries in China were amongst the early Europeans who took an interest in the plants of that country. Many of the good plants grown from seed sent by them to their patrons in Paris now bear the names of their collectors. They have, however, been eclipsed by the marvellous work done by the late Dr. AUGUSTINE HENRY. He has been referred to as "a distinguished traveller, collector, botanist, philologist" and "a great and accomplished man and charming companion." He deserved all these terms of praise. He was a great man of great ability. HENRY was proud of his Irish ancestry which he could trace back to the O'Innerigh clan, and to one, OWEN HENRY, who was killed in battle in 1121.

HENRY was a native of Londonderry, born in 1857. Quite early in life he showed signs of ability and originality, qualities which he never lost. He graduated B.A. in Queen's University, Belfast, in 1877, M.A. in 1878. At both these examinations he took first-class honours and a gold medal with the B.A. degree. He then went to Galway College for a time, returning to Queen's College, Belfast, for his medical work, won a scholarship worth £150; afterwards he spent a year in a London hospital and got his M.D. degree. Bored with examinations and disliking practising as a physician, he returned to Belfast, where he met Professor REDFERN—a fortunate meeting, which influenced HENRY's future. Professor REDFERN told HENRY that there was a vacancy in the Chinese Customs Service under Sir ROBERT HART, who wanted a well-educated man and, if possible, one with some knowledge of medicine. HENRY promptly applied for the post, was recommended by Professor REDFERN and appointed, and so began his wonderful and eventful life in 1881.

His first station was at Shanghai. After a short time there he was sent to Ichang as Customs and Medical Officer, his hours being from 10 A.M. to 4 P.M. This gave him time to spend his evenings roaming the country, and thus he became interested in its vegetation. He brought back twigs and sprays of the plants he liked best and tried to find out their names, but could only get local Chinese names. Having carefully preserved a good many specimens he, as he described it to me, "had the audacity" to send them to Kew to get their botanical names. Not only did he get names, he got praise and encouragement, which increased his interest. He himself collected, and trained his men to collect, any uncommon plants they saw and bring in to him. While at Ichang he collected largely in the Yangtse gorges. Having prepared a great number of specimens, a collection was sent to Kew which proved to be of the greatest interest; it was followed by others, so that in 1896

500 new species and 25 new genera had been established, and many more were added after that date. During the fifteen years the number of specimens, dried and labelled, sent to Kew numbered 158,000.

These specimens sent home by HENRY had a great influence on British gardens. The beauty and variety of the plants so impressed the late Sir HARRY VEITCH that he sent a collector, the late E. H. WILSON, to China, and others followed later—PURDOM, FARRER, FORREST, KINGDON-WARD, COOPER and others, names which will always be associated with many of the fine plants from China now in our gardens, but the name of AUGUSTINE HENRY will always stand out as the pioneer.

HENRY did not confine his interest to plants only. He had a tutor in the early mornings to teach him the Chinese language and, as he became a good speaker, he got promotion in the service. His Customs duties took him to new places, and consequently to new types of people, plants and animals, all of which excited his interest and were studied. Before he left Ichang he had discovered a new antelope. Later he was promoted to the rank of Mandarin. When he travelled about collecting the Customs dues he was provided with a Mandarin's escort. In the course of this work he made wide circuits to many places. Once on his return to a district where he had formerly been well received he was astonished to meet considerable hostility and opposition. It was his habit to march out of the districts at the head of his men. He found that some of his guards lagged behind and robbed the people. In future HENRY made his escort march out in front of him, he following behind. He had no further trouble.

HENRY remained at Ichang for several years. He was then sent to Mong Ize in Southern Yunnan, where he made some of his most important finds, including the true Chinese Tea plant in its wild state, this being its first recorded discovery.

He was also stationed at Sze-mas and Sze-chuan, whence he penetrated among the primitive tribes of Lolos, studied their customs and compiled a dictionary of their language.

HENRY did not confine his collecting to China. In 1892 he was sent to Ta-Kow in Formosa and as soon as he had settled down he began work with his usual energy, making a collection of well-preserved specimens. He also wrote a book on the Flora of the island. HENRY paid special attention to the Lilies; *Lilium Henryi* was grown from seed introduced by him. Many other beautiful plants discovered by him bear his name. The journeys through China, the very varied types of vegetation, the beauty of some of the trees had a great influence on him, so much so that when, in 1900, he left China for England, he immediately began studying how best he could help to create an interest in forestry and the study of trees. To gain information he visited Algiers, Japan, Ceylon and other places. In 1901 he went to the United States of America, where he spent a very useful time with the late Professor SARGENT of the Arnold Arboretum, visiting the various districts where Arboriculture played an important part.

* Determined to perfect his knowledge in all the technique of forestry work, HENRY went for two years to the French National School of Forestry at Nancy. On his return to England in 1903 he started his great work when, in collaboration with the late HENRY ELWES, as joint authors they began the work of writing *The Trees of Great Britain and Ireland*. This work occupied most of their time and was exacting and very thoroughly done. In special districts they worked together, otherwise they took separate districts. If any doubt arose they revisited the district together. No county was omitted; England, Ireland, Scotland and Wales were closely searched. In order to observe the trees in their native habitats, HENRY visited all the countries of Western and Central Europe. There are seven volumes of this book with many beautifully reproduced photographs. Begun in 1903, the first volume appeared in 1906 and the work was finished in 1913.

In 1908 HENRY married ALICE HELEN, daughter of Sir LAUDER BRUNTON, Bart. She accompanied him on all his European travels and was invaluable in helping him. She translated all his manuscripts into French and German.

The collection of the specimens he assembled for the writing of the *Trees* was continued later all through his journeys. It now forms the "Henry" Forestry Herbarium of Glasnevin Botanic Gardens, Dublin, and contains 9,000 specimens of Conifers and broad-leaved trees, all of which have been arranged and classified by Mrs. HENRY. This work occupied the years from 1930 to 1939. In addition to his work on the *Trees*, in 1907 HENRY was at Cambridge helping to establish there a School of Forestry. In its early stages he was appointed Reader in Forestry; later, when the School of Forestry was established he became Professor of Forestry. This post he resigned in 1913 to return to his native land to become Professor of Forestry in University College, Dublin.

HENRY's energy never flagged. In his spare time he wrote articles on many and varied subjects connected with trees and forestry and gave many public lectures on the subject. His correspondence was very large. He was consulted by many of the able men who followed him in collecting plants in China and other countries. To them his knowledge of conditions was freely and generously given, his advice saving them from many pitfalls and useless journeys.

In my opening sentences I mentioned several of the many attributes of HENRY's character. Of these fine qualities all his busy life he gave many proofs, a few of which may be recorded. He was a great talker, and would sit for hours by the fire in my study during the long winter evenings telling of his many and varied experiences; he talked simply and without a trace of boastfulness. "He was very patient in listening to others. He was very determined in carrying out any work he undertook and very thorough and painstaking in his methods. I never saw him angry or perturbed, but he could be very firm. He had acquired an almost oriental calm of manner, especially when others became excited.

On one occasion he and two other Europeans were at a lonely outpost in China. There was a riot and an excited mob arrived to burn the building. HENRY went out alone to meet them, found the leader and talked to him with such good effect that he succeeded in getting the rioters withdrawn, and he and his companions were left in peace.

On one occasion, in the early days of motoring, HENRY and ELWES were touring in Ireland to verify accounts given of some trees. They were in the town of Strabane, where I was to join them travelling by a train which left Dublin at 6.5 A.M. On arrival I found some excitement in the market-place and saw that an accident had happened. HENRY was the only calm person there. It appeared that a young horse under a hay-cart with the long shafts used in this country which stick out behind had become frightened as the car approached and began to back quickly. The driver of the motor car made a rapid swerve and crashed into a lamp-post with such force that it fell back on the car, not striking HENRY or ELWES but giving the driver a blow on his head which was bleeding. The car was not seriously damaged. As I approached, HENRY casually remarked, "You are up to time. That was a bad knock the lamp-post got: I suppose we will soon be able to start."

We had another motor accident on that tour: going down a steep hill we met another car coming from Killarney and collided. Both cars were damaged but no one was hurt. The young English tourists who were in the big car leaned against the bank on the roadside and regarded us silently and superciliously. ELWES, extremely angry and very vocal, made many suggestions how to disentangle the two cars. HENRY remarked in his quiet way, "All this is bringing us no nearer to our dinner: hadn't we better walk on to Killarney?"—which we did.

The following extracts from the diaries of Mrs. HENRY illustrate HENRY's perseverance and patience. He was very much interested in the Serbian Spruce *Picea Omorika* and determined to look down on a forest of it, so ascended a high peak of the North-West Serbian range. "The view would have been grand: we were between 5,000 and 6,000 feet up. We went along giddy edges of precipices into seas of fog which concealed vistas of Bosnian mountains. Bitterly disappointed after days of climbing, HENRY just said 'What a pity,' and went on."

In August 1921 he was in the Freudenthal, Silesia. "Augustine was on a most earnest search for larch cones. Herr BAUDISCH, the head of the Forestry Station, told us that there was not a single cone on the larches this year. He said, 'Usually they are covered with cones, and once in a rare while there are none, and so it has happened this year.' We had heard the same thing in the morning from the Forestry Inspector, but he had called up his foresters with saws, and offered to fell any tree Augustine might choose. However, there actually was not one single cone, old or young, to be seen on any tree. We had walked for six hours. Augustine still persisted, quite firmly,

that he *would have* cones. He led the party (quite sceptical) along a very hot and dry river bed on the outside fringe of the forest. The cones *were* there, on three trees out of about three hundred thousand. 'How did you know, Herr Doktor, there would be cones there?' asked Herr BAUDISCH. 'Always at the lowest, warmest, and most sheltered fringe of a forest fruit will set when it has set nowhere else,' Augustine replied."

HENRY heard that *Lilium croceum Chaixii* (the Fire Lily) had become very scarce and had disappeared in the Dauphiné. He determined to look for it; in 1927 he found a station of it at Pelvoux in the Dauphiné, and a single station in Switzerland at Zerneux in the central Engadine. In both places it is decreasing rapidly in spite of being protected by law.

And now an instance of HENRY in lighter vein. He had just become engaged to be married, and arrived from London to give a lecture at the Royal Dublin Society. As usual, he made his audience very enthusiastic and at the close of his lecture was asked and answered a number of questions. When he left the theatre he asked where he could write a letter to Miss BRUNTON to catch the mail to London, so I brought him to a private room and sat down to wait until he was finished. Some of his hearers, anxious for more information, opened the door, but HENRY's absorption in his letter deterred them; one, bolder than the rest, approached him saying he wanted to know what would be the best and quickest way to grow a hedge of Japanese Larch. Without lifting his eyes from his letter, or stopping his pen which was travelling rapidly over the paper, HENRY called out in his clear, resonant tones, "Sow it with love seed, my dear fellow, sow it with love seed—only go away and leave me alone." The astonished inquirer fled. I never heard if this method was successful!

Honours were freely bestowed upon him. They are too numerous to mention all, except the following:

Cambridge—M.A. Honoris causa.

Royal Horticultural Society—Victoria Medal of Honour.

" " " Veitch Memorial Medal.

" " " Fellow of the Linnean Society.

Corresponding Member of the Academy of Agriculture of France
—a distinction rarely bestowed on a foreigner.

Member of the Royal Irish Academy.

The tribute which gave him most pleasure was the following, received thirty years after he had left China:

'To AUGUSTINE HENRY

Through whose assiduous botanical exploration of
Central and South-Western China the knowledge
of our Flora has been greatly extended
this Second Fascicle of the
Icones Plantarum Sinicarum
is respectfully dedicated, 1929';

and the personal letter from Professor H. H. HU, Fan Memorial Institute of Biology, Peking, China : " As a pioneer and veteran botanist of Western China, you have not only added to the world much scientific knowledge of Chinese flora, but you have set up a great example for Chinese botanical students. This dedication is our humble appreciation of what you have so nobly achieved."

HENRY died in March 1930.

(For portrait, see Fig. 1.)

PROTEIN FROM THE GARDEN.

IN these days of rationing the chief difficulty is to obtain a sufficient quantity of protein to provide a properly balanced ration. A man on light work requires from $2\frac{1}{2}$ to 3 oz. of protein per day, and if extra physical work calls for additional energy foods, some more protein is required for their digestion. People over fifty can cut their protein ration a little with safety ; on the other hand, young people who are growing require more.

The energy foods which we consume in order to drive the machine—bread, oatmeal, Potatos—are insufficiently provided with protein, rice contains very little, sugar and butter or margarine none at all. In normal times most people get the protein they require from milk and cheese, meat and fish, and eggs, just the foods that are in short supply. Moreover, the garden which is to most of the readers of this JOURNAL their sheet-anchor in time of scarcity does not so easily replace this deficiency of protein, especially in the winter. Cabbages and Kales, Turnips, Artichokes, Parsnips and Beet are all suppliers of starch and other carbohydrates, but are not balanced by the small amount of protein they contain. It is only when we come to Peas and Beans that the garden begins to provide foods rich in protein, quite good protein too, comparable with the casein of milk and cheese.

Now that is all very well for the months from June to October when we can keep up a succession of Broad Beans, French Beans, Peas and Runner Beans, but there is nothing rich in protein coming from the garden in winter. The vegetarians and the economical housewife used to be able to fill up the gap by buying Haricot Beans or Butter Beans, Lentils or split Peas, but these are mostly overseas products and are getting scarce in their turn. For two or three years now the Ministry of Agriculture has been pressing gardeners to grow Haricot Beans for themselves, but these can only be trusted on the warmer soils and to many people have proved disappointing. We shall be publishing an article from a correspondent who has been successful with them.

Peas provide a safer general crop for the garden—Peas, that is, which are allowed to ripen and then dried off and beaten out to store for the winter. They will answer nearly everywhere in England; they can be sown early and come to harvest in July or August, whereas Haricot Beans must not be sown until risk of frost is over and are often only ripening in doubtful September weather. Peas for drying have always been grown as a field crop, especially in Lincolnshire, and the acreage has been considerably increased during this year. Many of our readers must be familiar with the little packets in which of late years they have been made up for sale. In the north country fairs and markets the little push cart with a boiler from which the cooked Peas can be brought and eaten on the spot, is still a familiar sight. Peas also are good croppers, and they can be readily introduced into our English cookery methods. Usually they are softened and boiled in place of green Peas, but they may be made into soup or added to one of the thick vegetable soups like “minestrone” (see R.H.S. JOURNAL, 1941, p. 99) instead of the chick Peas or Haricot Beans that are there recommended. While seed of any early dwarf variety can be saved, it is strongly recommended that seed of ‘Harrison’s Glory’ be obtained, the variety which is commercially grown for dried Peas and can be purchased from any agricultural seedsman. We shall be publishing an article on its cultivation; the present note is to urge our readers to procure some seed at once, for in a forward season it can be sown in February. If there is room in the garden, do not stint the space given to these Peas for drying.

Of course any of the Beans—Dwarf or Runner—if ripened and threshed out, just as is done for seed saving, provide protein food. But the flavour is not very attractive and they need to be disguised in soup or stew.

One pint of Peas will sow a row 80 feet long; the rows should be 2 feet apart, and the yield from one pint should be about sixteen- to twenty-fold. Seven pounds of seed should produce a hundredweight of dried Peas for winter supplies.

A. D. H.

ANNUALS IN WAR TIME.

By A. P. BALFOUR.

(Figs. 2-5.)

THERE are many reasons why annual flowering plants should fill a place in our gardens in war time. Before I go on to the purely practical reasons, allow me to put in a plea for them on their merits alone. The exigencies of war are driving us all, and not a bad thing too from many points of view, to find our pleasures and real satisfaction in the simple things of life. Annuals, by their structure and habit of growth, are the simplest plants grown in a garden, and in properly planned associations the most natural. They cheer us by their simplicity, and charm us by the brightness of their colouring and profusion of flowering. A mixed border by themselves, an edging to a path, or skilfully placed groups among more permanent subjects give a sense of lightness, colour and freedom most refreshing in these days of restrictions and regulations. Annuals, used in the way nature meant them to be used, in bold masses, can be the making of any garden at certain seasons of the year. In war time, annuals, on account of their comparatively low initial cost and economical requirements in the way of cultivation and manuring, are doubly useful. I am quite aware that an increasing proportion of the garden must be devoted to the growing of urgently needed food in the way of fresh vegetables. There are, however, many parts of the garden which are quite unsuited to the successful growing of vegetables, and still admirably suited to the cultivation of annual flowers.

An important use of annuals generally in war time is in filling a gap, holding the fort, so to speak, until the replacement or replanning of more permanent subjects can take place. Old friends, whether in the border or rock garden, probably difficult or too expensive to replace in war time, die out through frost and cold, flood or drought, or simply from lack of skilled attention. Their places can be adequately and economically filled temporarily by the correct use of annuals.

Another equally important contribution of annuals for help in overcoming war-time conditions in gardens is for furnishing decorative subjects for the cold house. There are many glasshouses and frames which for one reason or another cannot all be utilized for the growing of vegetables but which, although unheated, may be very well used at little cost for the growing of annuals in pots; both for decorative effect where they are, and for use in the dwelling-house where they add so much to the joy of living. Even to-day, in spite of talks on the wireless, lectures to gardening societies and articles in gardening papers and the general press, it is astonishing how many people are unaware of the many delightful plants which can be grown in pots, and flowered in a few weeks from the time of sowing, in the cold greenhouse. Swan River Daisy sown, say, the middle to end of March and potted on singly into 5-inch pots, will make neat, bushy plants 18 inches

high and 12 inches through, covered in flower by the end of June, and will remain in flower nearly three months. Many attractive shades of mauve, pink, lavender and purple with contrasting centres can be had, and under glass one can appreciate their distinctive scent. *Phlox Drummondii* is another splendid subject with a much wider range of colouring and habit, and a sweet scent almost like honeysuckle. The 'Beauty' Strain is the best for pot culture with large flowers and compact habit, and a colour range from white to pink, mauve, blue, violet, crimson and bright scarlet, and a very lovely glowing salmon. These do best with a rather stiffer compost than the usual run of annuals, and so do Godetias. As my space is limited, I append a list of subjects suitable for this purpose, and, for a few of the more important, approximate times of sowing, range of colouring and time of flowering.

A further most valuable use for annuals in war time is for the production of cut flowers for the house, so indispensable in these days of strain and stress. This is where autumn sowing comes in so useful, especially for the South of England. Extra hardy subjects such as Godetia, Larkspur, Shirley Poppy, Sweet Peas, Nigella and others come into flower three to four weeks earlier than spring sown, and with stems nearly twice as long, the only requisites being an open, sunny, well-drained position, and a piece of ground available at the end of August and early September. The ground should be turned over as early as possible after clearing the previous crop, and a firm seed bed with a good tilth is essential. If the weather is very dry, I usually simply hoe over the land thoroughly to clean it and produce a good tilth, and sow as soon as rain comes after the end of August. Moderate but not too thin sowing is required—to allow for slugs and losses due to other causes in winter—and very little thinning is required. In ordinary times an odd corner of the vegetable garden is very suitable for the cut flower patch. In these days a plot quite close to the house is the most convenient for the busy housewife.

Many of us have had to go into new houses and strange gardens recently. Annuals have proved of great value in brightening borders and improving the colour effect and interest generally of our temporary surroundings. Rough banks and unkempt hedges can be made bright with Climbing Nasturtiums, Annual Convolvulus, Canary Creeper, and a host of other subjects. Such a garden, too, can be greatly helped by the use of small groups of annuals in unexpected places. A sunny corner filled with a patch of *Platystemon californicus* associated with *Nemophila insignis*, a group of *Viscaria* in mixed colours which blend so happily, a pathway edged with the Veldt Daisy in its lovely range of colouring, give interest and pleasure at a minimum of cost and labour. I knew a garden last year with a small rough bricked corner near the side door. The owner scattered a few seeds of Virginian Stock in the joints of the brickwork and made a charming picture all summer.

Let us then use annuals freely in our gardens in some or all of the

ways I have indicated, as well within the limits of our war effort, in fact as assisting in it. By the skilful use of these simple and economical plants even in the midst of the greatest war of all time, we can have joy and beauty in our gardens.

ANNUALS FOR THE COLD HOUSE.

(Including a few biennials and some perennials easily raised from seed and most suitable for this purpose.)

Acroclinium	<i>Lantana hybrida</i>
Agathaea	Larkspur
Alonsoa	<i>Limnanthes Douglasii</i>
Anchusa	Linaria
Angelonia	Lobelia
Antirrhinum	Marguerite Carnation
Aquilegia	Marigold, African
Asters (inc. <i>A. Pappi</i>)	Marigold, French
Arctotis	Mesembryanthemum
<i>Browallia speciosa major</i>	Mignonette
Calendula	Mimulus
<i>Campanula pyramidalis</i>	Myosotis
<i>Campanula persicifolia</i>	Nasturtium
<i>Campanula</i> 'Sutton's Basket'	Nemesia
Canterbury Bells	<i>Nemophila insignis</i>
<i>Celsia arcturus</i>	<i>Nicotiana affinis</i>
Chrysanthemum, Annual	<i>Nicotiana</i> 'Miniature White'
<i>Chrysanthemum</i> 'Sutton's Cascade'	Petunia
<i>Clarkia elegans</i>	<i>Phacelia viscida</i>
Cornflower	<i>Phlox Drummondii</i>
Datura	Poppies, Annual varieties
<i>Delphinium sinensis</i> 'Blue Butterfly,' and other varieties	Rhodanthe
<i>Dianthus Heddewigii</i>	Rudbeckia
<i>Diascia Barberae</i>	Salpiglossis
<i>Didiscus ceruleus</i>	Scabious
<i>Dimorphotheca aurantiaca</i>	Schizanthus
<i>Dimorphotheca chrysanthemifolia</i>	<i>Statice Suworowi</i>
<i>Echium plantagineum</i>	Stocks (Winter-flowering Intermediate and 'Giant Perfection')
Eschscholtzia	Sunflower, Dwarf Miniature
Felicia	Swan River Daisy
<i>Francoa ramosa</i>	<i>Tithonia speciosa</i>
<i>Gaura Lindheimeri</i>	Torenia
Godetia	Trachelium
Gypsophila	Ursinia
Heliophila	<i>Venidium fastuosum</i>
<i>Hunnemannia fumariaefolia</i>	<i>Verbascum phoeniceum</i>
Impatiens	Viscaria
Kochia	Zinnia

MORE DETAILED INFORMATION OF SOME OF THE MOST USEFUL SUBJECTS.

Subject.	Time of Sowing.	Colour.	Time of Flowering.
Antirrhinum .	{ Aug.-Sept. Feb.-March	White, primrose, yellow and shades of pink, apricot, orange, red, crimson and mauve	May-July June-Aug.
<i>Browallia speciosa major</i>	March-April	Blue	July-Sept.
Calendula . .	{ October February	Lemon, orange and shades of apricot, orange and cream	Jan.-March May onwards
Cineraria . .	May-June	White, pink, red and all shades of blue	Feb.-May
<i>Clarkia elegans</i> .	{ September February	White, pink, salmon, crimson and purple	May-June June-Aug.
<i>Dimorphothea</i> .	Feb.-March	Primrose, buff, apricot, and salmon shades	May-Aug.
<i>Echium plantagineum</i>	March-April	White, rose pink, purple and blue	June-Aug.
Felicia . .	Feb.-March	Shades of blue	June-July
Godetia . .	September	White, shades of pink, crimson, salmon and mauve	May-July
Larkspur . .	{ Sept.-Oct. February	White, pink, salmon, mauve and blue	May-June June-Aug.
Linaria . .	{ Sept.-Oct. February	Primrose, pink, rose, crimson and mauve	March-April June-July
Marguerite Car-nation	February	Pure white, yellow, pink rose, scarlet and crimson	Aug.-Oct.
Marigold . .	March-April	Lemon and orange, and striped or blotched with rich brown	June-Sept.
Mignonette. .	{ August February	White, red and yellow	April-May June-July
Mimulus . .	March	Scarlet, and others blotched with crimson and red on yellow grounds	July-Aug.
Nasturtium .	{ September February June	Creamy white, yellow and shades of pink, salmon, red and crimson. Foliage all shades of green	Winter to early spring May-Aug. Oct.-Dec.
Nemesia . .	{ Jan.-Feb. March June July	Complete range of colours	April-June June-July Sept.-Oct. Nov.-Dec.
<i>Nemophila insignis</i>	{ September February	Bright blue	March-April May-June
Nicotiana . .	Feb.-March	White, pink and red shades	End of May to August
Petunia . .	March-April	White, pink, rose, violet and blue	June-Oct.
<i>Phlox Drummondii</i>	{ September February	Complete range of colour	May-June June-Aug.
Salpiglossis. .	{ September January	Rich-veined flowers in a large range of colours and combination of colours	May-June June-July

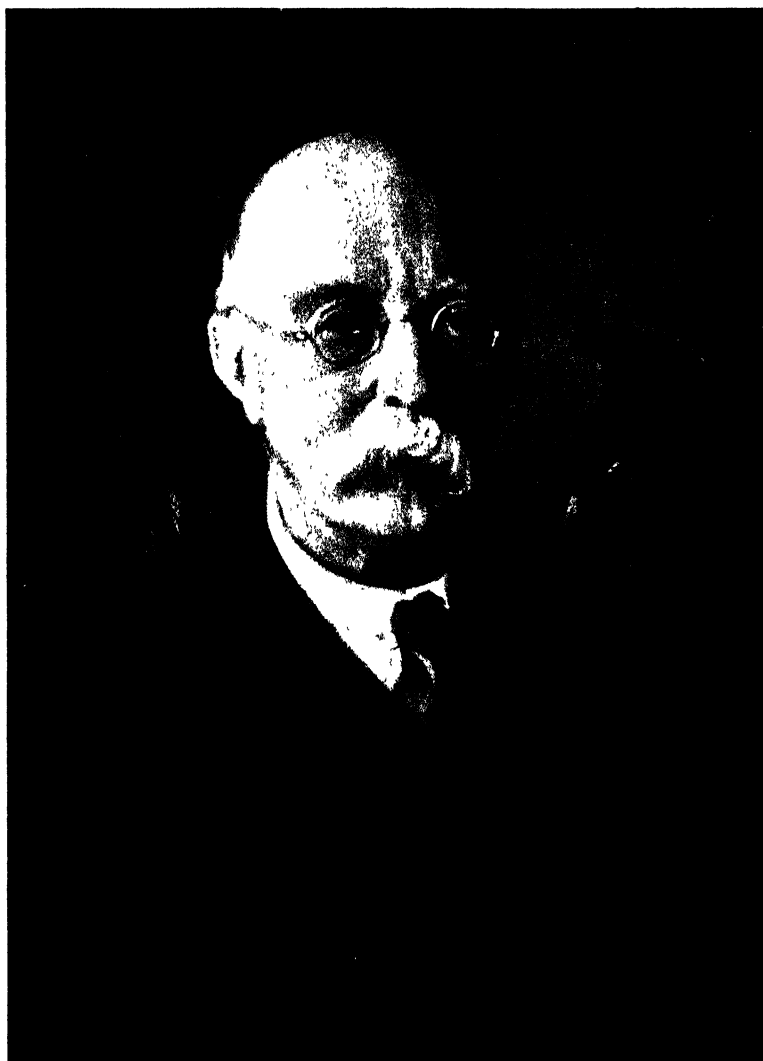


FIG. 1 AUGUSTINI HENRY, 1857-1930
(See p. 10.)



FIG. 2. *MESEMБRYANTHEMUM CRINITIFLORUM*
(See p. 17.)



FIG. 3. *DIMORPHOTHECA AURANTIACA*, BUFF. VARIETY
(See p. 17.)

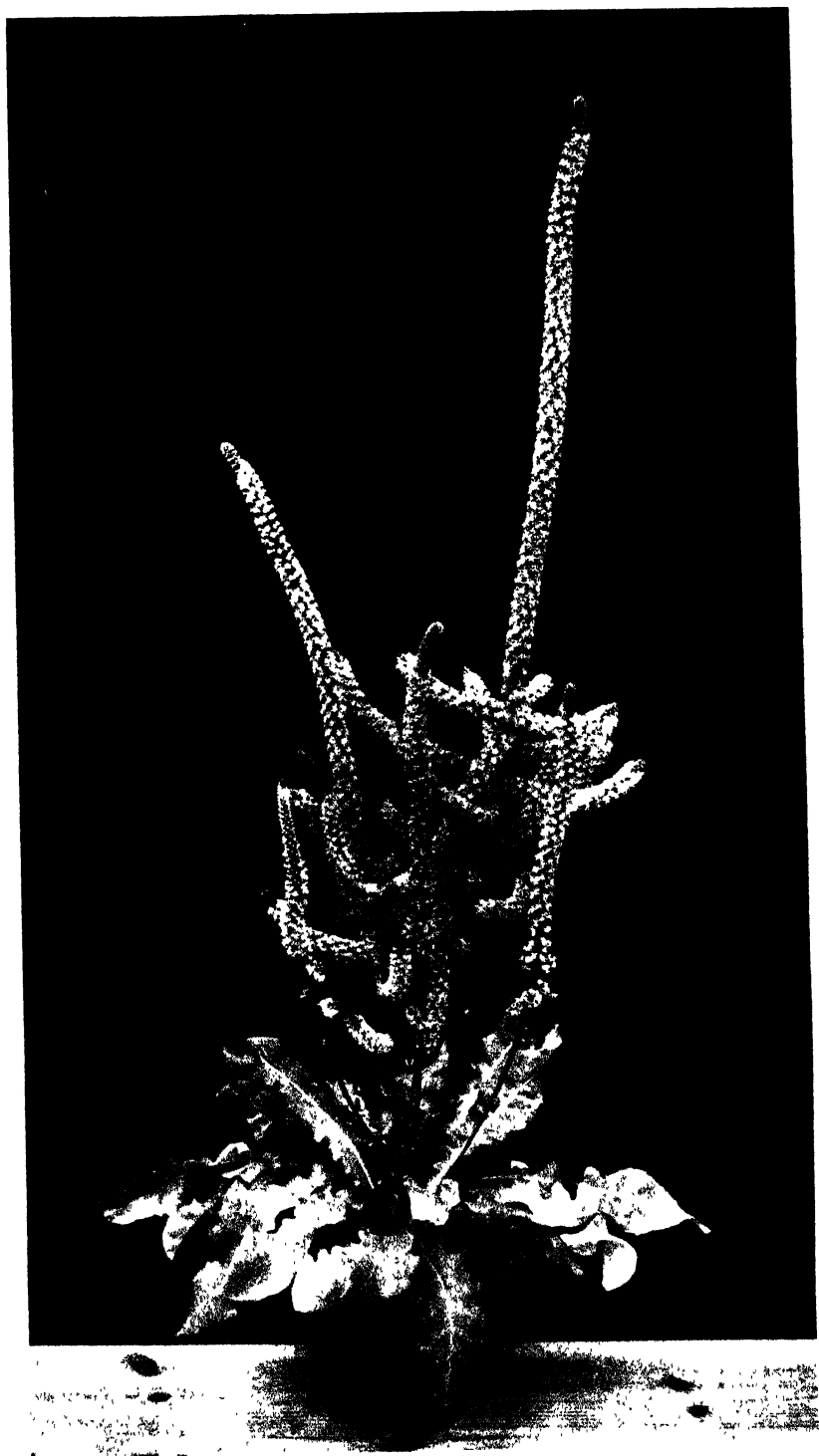


FIG. 4 — *STATICE SUWOROWII*.
(See p. 17.)



Fig. 5 — ARLOTIS HYBRIDS

See p. 12



Photo V. K. Gouda

FIG. 6. *FUCHSIA MAGLIANICA* VAR. *GRACILIS*
(see p. 34)

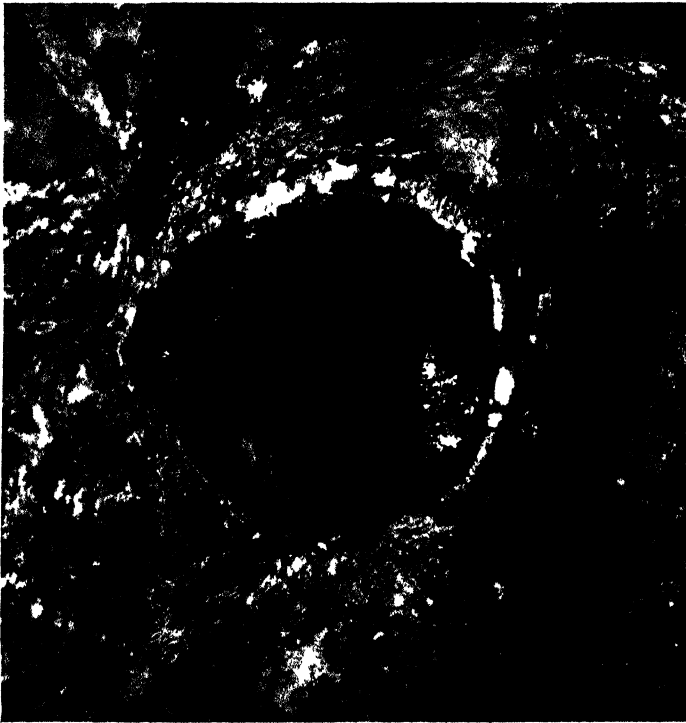


FIG. 7.—WOOLLY APHIDS COLONIZING VASCULAR TISSUES OF STAGLEBUSH
(See p. 28.)



FIG. 8.—LOGS OF PERMANENT APPLE APHIDS ON PRUNED
SHOOT
(See p. 29.)



FIG. 9 — TURNIP SOFT ROT
(*Bacillus carbo-vivum*)
A greyish mushy rot which quickly destroys the flesh of
the edible root

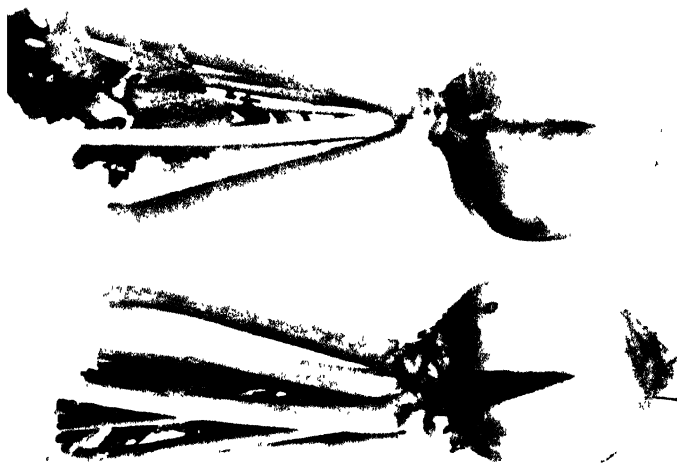


FIG. 10 — TURNIP GROWTH CRACKS
The one on right has already healed up, but the one on
left is invaded by soft rot bacteria.
(See p. 37)



FIG. 11 — TURNIP BROWN HEART.
Greivish or brownish discoloured
areas in the fleshy root tissue.
(See p. 37)



FIG. 12.—KOHLE RABI CLUB ROOT
(Plasmiodiophora Brassicae.)
 Gnarled and misshapen swollen roots
 (See p. 39.)

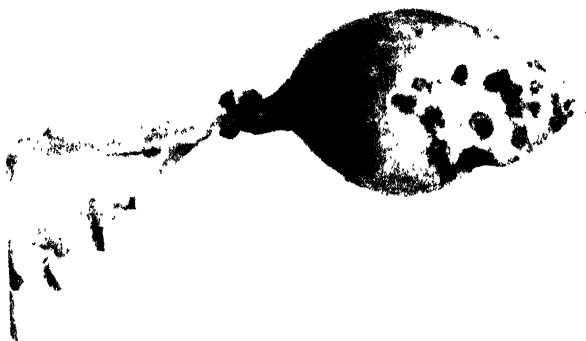


FIG. 13.—RADISH SCAB
(Actinomyces Scabiei.)
 Sunk scabby places on the edible root.
 (See p. 39.)

MORE DETAILED INFORMATION OF SOME OF THE MOST USEFUL
SUBJECTS.—*cont.*

Subject.	Time of Sowing.	Colour.	Time of Flowering.
Schizanthus .	Aug.-Sept.	Shades of pink, apricot, carmine, crimson, mauve and purple in various markings and combinations	April-June
<i>Statice Suworowi</i>	Feb.-March	Bright rose	June-July
Stocks :			
Ten-week .	Mar.-April	Very wide range of colouring	July-Aug.
Intermediate vars. 'East Lothian' .	March		Aug.-Sept.
Winter-flowering vars. 'Beauty of Nice' .	June-Aug.		Dec.-Feb.
Brompton .	Aug.-Sept.		May-June
Swan River Daisy	March-April		June-Sept.
Ursinia . .	Feb.-March	White, rose, mauve, lavender and blue	May-July
		Rich orange with rich crimson-purple zone	
Viscaria . .	{ September	White, blue, pink and rose shades	Mar.-April and May
	{ Feb.-March		June-July
Zinnia . .	February	White, yellow, pink, salmon, orange and scarlet	June-Aug.

ANNUALS FOR THE ROCK GARDEN.

<i>Abronia umbellata</i>	<i>Eschscholtzia</i> 'Miniature Prim-rose'
<i>Acroclinium</i>	<i>Felicia</i>
<i>Adonis aestivalis</i>	<i>Gamolepis</i>
<i>Agrostemma coeli-rosa</i>	<i>Gazania</i>
<i>Androsace coronopifolia</i>	<i>Gypsophila muralis</i>
<i>Arctotis</i>	<i>Ionopsidium acaule</i>
<i>Asperula azurea setosa</i>	<i>Kaulfussia</i>
<i>Calandrinia umbellata</i>	<i>Leptosiphon hybridus</i>
<i>Cheiranthus Allionii</i>	<i>Limnanthes Douglasii</i>
<i>Cheiranthus linifolius</i>	<i>Nemesia</i>
<i>Clintonia pulchella</i> (Downingia)	<i>Nycterinia selaginoides</i>
<i>Collinsia bicolor</i>	<i>Platystemon californicus</i>
<i>Cotula barbata</i>	<i>Portulaca</i>
Daisy (small-flowered varieties)	<i>Sanvitalia procumbens</i>
<i>Delphinium</i> 'Fairy Queen' and 'Blue Butterfly'	<i>Sedum coeruleum</i>
<i>Diascia Barberae</i>	<i>Shortia</i> (<i>Baeria</i>) <i>californica</i>
<i>Dimorphotheca</i>	<i>Ursinia</i>
<i>Eschscholtzia maritima</i>	<i>Virginian Stock</i>
<i>Eschscholtzia</i> 'Miniature Yellow'	

ANNUALS FOR AUTUMN SOWING.

Calendula	Limnanthes
Candytuft	Linaria
Cheiranthus	Godetia
Cornflower	Nigella
Eschscholtzia	<i>Platystemon californicus</i>
Glaucium	Shirley Poppy
Larkspur	Sweet Pea

This list could be considerably extended for very favourable situations.

ANNUALS FOR CUT FLOWERS.

Acroclinium	Marguerite Carnation
Annual Chrysanthemum	Mignonette
Aster	Nasturtium
Arctotis	Nemesia
Calendula	Nigella
Cornflower	<i>Phlox Drummondii</i>
Coreopsis	Poppies, Annual varieties
Cosmea	Rhodanthe
<i>Clarkia elegans</i>	Rudbeckia, Annual varieties
Dahlia	Scabious
Eschscholtzia	Statice
Godetia	Stock
Gypsophila	Sunflower
Hawkweed	Sweet Pea
Helichrysum	Sweet Sultan
Jacobaea	Ursinia
Larkspur	Viscaria
Lavatera	Zinnia
Linaria	

ANNUAL GRASSES.

<i>Agrostis laxiflora</i>	<i>Eragrostis elegans</i>
<i>Agrostis nebulosa</i>	<i>Hordeum jubatum</i>
<i>Briza maxima</i>	<i>Lagurus ovatus</i>
<i>Bromus aureus</i>	<i>Stipa pinnata</i>
<i>Eragrostis abyssinica</i>	

ANNUAL CLIMBING PLANTS.

Canary Creeper (<i>Tropaeolum canariensis</i>)	<i>Lophospermum</i> (<i>Maurandia scandens</i>)
<i>Cobaea scandens</i>	<i>Mina lobata</i>
<i>Convolvulus major</i>	Tall Nasturtium
<i>Eccremocarpus scaber</i>	Ornamental Gourd (<i>Cucurbita</i>)
<i>Humulus japonicus</i>	Sweet Pea
<i>Ipomoea rubro-coerulea</i>	

ANNUALS FOR EDGINGS.

Ageratum	Lobelia
Alyssum	Marigold, Dwarf French
Anagallis	Nasturtium, Dwarf varieties
<i>Antirrhinum</i> 'Sutton's Little Gem'	Nemophila
<i>Cotula barbata</i>	<i>Phlox Drummondii</i> , compact vars.
<i>Eschscholtzia</i> 'Miniature Prim-rose'	Portulaca
Gamolepis	<i>Shortia californica</i>
Godetia, Dwarf varieties	Silene
Golden Feather	<i>Tagetes signata pumila</i>
Kaulfussia	Verbena, Bedding varieties
<i>Leptosiphon hybridus</i>	<i>Verbena venosa</i>
<i>Limnanthes Douglasii</i>	Virginian Stock
	Viscaria, Dwarf varieties

ANNUALS FOR TOWNS.

Alyssum, Sweet	Nemophila
Annual Chrysanthemum	Night-scented Stock
Aster, China	Nigella
Calendula	<i>Phlox Drummondii</i>
Clarkia	Poppy
Collinsia	Stock, Ten-week
Coreopsis	Sweet Scabious
Eschscholtzia	Sweet Peas
<i>Gypsophila elegans</i>	Verbena
Larkspur	Virginian Stock
Mignonette	Zinnia
Nasturtium	

ANNUALS FOR COVERING ROUGH BANKS, ETC.

Annual Chrysanthemum	Lavatera
Calendula	Linaria
Convolvulus, climbing and dwarf	Lupines, Annual varieties
Coreopsis	Nasturtium, climbing and dwarf
Cornflower	Poppy, Opium
Eschscholtzia	Poppy, Shirley
Glaucium	

ANNUALS FOR FORMAL BEDDING.

Ageratum	Dahlia
Antirrhinum	Dimorphotheca
Arctotis	Kochia
Aster	Lantana hybrids
Browallia	Lobelia

Marigold, French and African	Salvia
Nemesia	Stock
Petunia	Ricinus
<i>Phlox Drummondii</i>	Verbena
Salpiglossis	Zinnia

SOME METHODS OF PROTECTING AND FORWARDING SALAD AND OTHER VEGETABLE CROPS.

By J. WILSON.

SOILS and aspects vary considerably even in small areas, and not all soils and situations are capable of producing early salad crops and vegetables. In some districts soils are naturally favourable to early crops and it is therefore in the less favoured places that ways and means need be adopted to hasten crops by every method at our disposal with the minimum of expenditure. Much can be accomplished in this direction by the aid of glasshouses, hotbeds and heated frames, but it is methods other than these with which these notes are concerned.

The first essential is that the ground should be well drained, and when good drainage does not exist steps must be taken to rectify this defect, as ground which contains excess moisture is naturally cold.

There are several methods whereby crops can be forwarded and protected, as, for instance, by the continuous cloche, Dutch lights and improvised frames and coverings, various forms of protection for individual plants, screening by hurdles, fencing and soil ridges, protective intercropping and application of hastening manures.

With the introduction of the various types of continuous cloche, the protection and forwarding of salad crops and vegetables is much easier than twenty-five years ago. There are many types of this excellent form of cloche on the market at the present time, some of very simple construction and easy to transfer from one crop to another. It is important when using this form of covering to arrange the rows of the crop to be covered in such a manner that the maximum amount of crop fits under the cloches. Where there are insufficient cloches to cover the whole crop, then they should be so arranged that alternate rows are covered and the intervening ones receive shelter only from the cloches. If the rows of cloches are long, it is advisable to put in an intersecting piece of glass at short intervals to lessen the danger of draughts. The ends of the cloches should also have a sheet of glass for the same purpose, and to keep out vermin.

When one crop raised under cloches is harvested, the cloches should be moved to another; when they are not in use they are easily dismantled and stored in a comparatively small space. There must be

a large number of gardens where this type of cloche is already in use and its virtues well known. On the other hand, those new to its merits need not embark upon a costly outlay, as much is possible by having a small quantity which can be moved from crop to crop as circumstances demand. Some types of continuous cloche can be opened to admit air and rain when necessary. Apart from their value in forwarding crops by the protection they provide from frost, cold winds, excessive rain and to a certain extent from vermin, these cloches also enable seeds to be sown earlier in the spring than would be possible in the ordinary way, and make possible the wintering in the open of such crops as Lettuces, Spinach and Onions where difficulty would otherwise arise.

Amongst the crops which receive benefit from continuous cloches are Lettuces, Cauliflowers, Spinach, Carrots, Peas and Beans, Parsley and Radishes.

Another type of protection of comparatively recent introduction is the Dutch light ; this resembles a picture frame glazed by one large square of glass, the light being approximately 58 by 32 inches. These provide a maximum amount of light and a freedom from drip to the plants covered, and are easy to move from place to place. It is not necessary for the owner of a small garden to possess many, for much can be accomplished by having, say, four which can be moved to various positions as the necessity arises.

These lights are easy to fix in position to form a frame, made by fixing a wide board at the top and a slightly narrower one at the bottom, providing sash bars at the necessary intervals. These lights are most useful for the growing of Lettuces, Carrots, Turnips and Radishes in the early spring. A word of warning is necessary regarding these lights ; there must be some means of securing them from being displaced by rough wind.

Where spare frame lights of any type exist, and it is possible to obtain the materials necessary for the purpose, such as wide boards, corrugated sheeting or even turf which can be built up to form the sides, rough or temporary frames can be constructed. These can be pressed into service for raising seedlings of Lettuces, Cauliflowers, Cabbages, Onions, etc.

By using a bottomless box with a sheet of glass or frame light placed over it, such seeds as Cabbage, Cauliflower, Lettuce and Onion can be sown in January ; the crops from these sowings mature much earlier than from similar ones sown in the open at the earliest date possible. This method is particularly useful in small gardens where it is difficult to procure an early seed bed in the open, and also where difficulty is experienced in growing spring-sown Onions on account of the ravages of the Onion fly. Mint can also be forwarded by a similar method.

Attention must be drawn to the advisability of providing covering in some form or other, such as hessian or mats made of straw, reeds or similar materials, which although not necessary in all cases is very

desirable in the production of early vegetable in the structure already referred to. By excluding frost a higher soil temperature is maintained.

As is well known, apple barrels and various boxes do good service for the forwarding of Rhubarb and Seakale ; when long strawy manure is at command this can be placed over the barrels and boxes with increased effect.

For plants such as Cauliflowers, Marrows, etc., transferred from cold frames to the open ground in early spring, protective covers usually obtainable from horticultural sundriesmen, such as round zinc cylinders and collapsible cardboard boxes fitted with glass tops, are now probably in short supply. There are a number of simple devices that may be used, amongst these the following : flower pots, both earthen and cardboard, are most useful in providing the necessary protection from night frosts until the plants become thoroughly established. A skeleton framework made with what are known as benders (green willow or hazel sticks in the form of half hoops pushed into the ground) can be covered with some form of material such as mats, hessian or sacks which have been cut open. This is useful to protect crops of Dwarf Beans or Potatos which only require protection from night frosts in early spring.

In exposed situations where cold winds are prevalent and prove disastrous to tender crops, some form of wind-break is desirable, such as wattle hurdling, close chestnut fencing or some rough framework which can be erected as a screen thatched with heather, broom, reeds or similar materials. These forms of protection are also useful for laying on the rough frames already referred to when lights have been removed to other frames for protecting smaller plants or those of a more tender nature.

Various simple methods can be applied to afford a little protection from cold wind. Raised ridges of soil at intervals across a bed of spring Cabbages or a continuous line of rough evergreen pushed well into the soil to form a break is also helpful. Judicious interplanting of the hardier vegetables such as Broad Beans, and Peas, with the more tender Dwarf Beans, Lettuces, etc., provides another means of protection. Much can be done in a small garden to forward a crop by sowing, in the first instance in a small block, such crops as Broad Beans and Peas. Sow fairly thickly in a well-drained sunny position in November, to be planted out at the orthodox distance apart in the following March. If the weather should prove very severe in the winter these could be more easily protected in such positions. Parsley sown in June or July to provide winter picking if sown in small blocks rather than a line can be more easily covered in a like manner. Where a wall exists with a south border at the base, a row of Potatos planted quite close to the wall will mature much in advance of similar ones grown in more exposed positions. No time should be lost in providing the earliest Peas with sticks even if they do not require them at the moment, as besides providing a form of protection for the Peas they

act in the same manner to those intercrops which are usually grown in association with Peas.

Where strawy manure and leaves are procurable, similar to that used for making hot-beds, this can be used for raising the temperature of soil in trenches. Prepare a trench 2 feet wide and about 18 inches deep, and into this trench place about 16 inches of the mixture which has been well trodden. Return 4 inches of the best soil, which will form a slight mound. This should prove an excellent place to grow early Lettuce and Carrots, Radishes, etc. An improvement upon this method is to place frames and Dutch lights over the trench; the gentle heat provided by the manure will greatly accelerate the growth of early crops.

On cold sites raised beds with a slight slope to the south form another means of forwarding crops. Trenches 18 inches wide and 9 inches deep running east to west are made, leaving a bed 3 feet wide between the trenches. The soil from the trenches should be placed on the beds and banked up about 6 inches high at the north side and gradually sloped to the ordinary level on the south side. This method is much improved by the provision of some brushwood shelters at intervals across the site, or other form of material as already suggested.

In cold districts where soil is on the heavy side many crops can be brought on early by a system of raised beds. Our forefathers used this system much more extensively in cottage gardens than is done to-day. Their method was to make beds 4 feet wide and 6 inches high with 18-inch pathways. This had the effect of draining the soil and consequently raising its temperature, which in turn produced earlier crops than would have been possible from ground left level.

Cabbages, Lettuces and Spinach which have wintered in the open or under cloches can be considerably hastened by the timely application of a nitrogenous manure such as nitrate of soda or sulphate of ammonia applied from about the middle of March, a fortnight often being gained in this way. In order to provide a succession of maturing crops it is recommended that only a portion of a particular crop should receive an application of a quick acting manure at one time. Dustings of soot to crops have the effect of darkening the soil, which in turn is made warmer, this benefit being passed on to the growing crops.

In conjunction with all the known methods of hastening vegetable and salad crops, the question of suitable varieties must not be lost sight of, and only those which by trial and repeated experiments have proved both hardy and quick to reach maturity should be grown.

HYGIENE IN THE WAR-TIME FRUIT GARDEN : WINTER OPERATIONS.

By G. FOX WILSON, Entomologist, Royal Horticultural Society.

THERE are scattered throughout the country in private gardens a very large number of fruit trees, many of them old and careworn through long neglect, but whose fruit is a valuable asset at this time when the importation of fruits from overseas is restricted.

The owners of such trees are anxious to conserve the fruit supply and to carry out, with certain reservations, the instructions given in the Ministry of Agriculture's "Growmore" Leaflet No. 9, entitled "Better Fruit: Disease Control in Private Gardens," for ensuring better and larger crops by avoiding losses through the ravages of insect pests and fungus diseases.

The chief measure for preventing such loss is to apply the most effective insecticide and fungicide in the correct way at the proper time, but the occupiers of small gardens are often at a loss to achieve this, owing to shortage of labour and to the cost of a spraying machine of a size capable of reaching the higher branches of tall trees.

Here then is one reservation, but, apart from the chemical control of fruit pests, there are a number of cultural and mechanical measures which may be adopted without undue expenditure to mitigate the losses due to the numerous enemies which besiege our fruit trees.

We commend to the garden owner, who is fortunate to possess or is able to borrow a suitable spraying machine, the minimum spraying programme outlined in the aforementioned leaflet. While spraying is by far the most important operation, the object of these notes is to indicate other measures for reducing the losses from pests and diseases.

Pruning.—This operation is the first requisite for rendering neglected fruit trees more vigorous and fruitful, more amenable to treatment, and more unlike a forest of branches through which light and air are unable to penetrate. The principles which underlie this operation and the methods to be adopted for all fruits were recently outlined in the Society's JOURNAL (*vide* POTTER, R.H.S. JOURNAL, 1941, 66, 392-8), and no further reference to this important subject is necessary here.

All dead branches, shoots and spurs should be removed and burned, for to allow them to remain would result in conditions favourable to pests (*e.g.* Bark Beetles and Shot-hole Borers) and diseases (*e.g.* Canker and Coral Spot).

All wounds exceeding half an inch in diameter should be pared smooth with a sharp knife, and the wound covered with white lead paint or Stockholm tar to exclude fungus spores and to avoid the colonization of such areas by the Woolly Aphis (Fig. 7).

Prune out all intertwining branches to allow a free circulation of air through the tree, but avoid drastic pruning of stone fruits (Damson, Plum and Cherry), otherwise excessive gumming may follow with deleterious effect to the tree. Soft shoots, together with "suckers," are favoured sites for the Woolly and other fruit-infesting Aphides, which tend to lay their winter eggs on them in late summer, so that their removal should be carried out before autumn is well advanced.

Hedges, especially Hawthorn or Whitethorn, adjoining fruit trees should be trimmed and kept closely clipped and the prunings burned in winter or early spring to destroy those pests which feed indiscriminately both on Rosaceous hedge plants and on fruit trees.

Cut off any shoots or spurs bearing the egg-bracelets of Lackey and March Moths, the egg clusters of Vapourer Moth attached to the female cocoon on some dead leaf, and all "mummified" Apples.

Rake up and burn all prunings, upon which not only the eggs of insects and mites may be present (Fig. 8) but also overwintering caterpillars of certain Tortrix Moths which shelter in the cracks, leaf scars and bud axils, and of some Gall-Mites which gather beneath the bud scales. The eggs of some pests do not succumb when the shoots upon which they are deposited are cut off.

Scrape all loose bark, mossy growths and lichenous patches from the trunks and main branches of old trees with the aid of a paint scraper, onion hoe or well-worn draw hoe mounted on a small handle, not forgetting the loose bark on posts to which wire-netting is attached. A number of pests, *e.g.* Mussel Scale, Codling Moth and Yellow-tail Moth caterpillars, Apple Blossom Weevil and others, find harbourage beneath loose bark, and its removal exposes the pests to birds, while many are injured mechanically by the implement employed.

Rubbish Clearance.—A considerable number of fruit pests seek shelter in rubbish of all kinds, including leaf-mould heaps, stacked turves, old pea-sticks, brick rubble, none of which should be stacked near fruit trees. The "nuisance value" to pests by turning the heaps, restacking the sticks and dispersing the rubbish is worth while.

Rake out all accumulations of dead leaves from hedge bottoms every winter, for several pests find harbourage among the dried material.

Clear waste land adjoining hedges, fences and ditch-sides of coarse weeds, fallen leaves, twigs, etc., which offer secure shelter to insects.

Clean any ditch of rubbish so that the drainage water flows freely along the channel.

The wood-pile is frequently a source of trouble owing to the shelter provided by pruned limbs and wind-riven branches from trees. Burn all the smaller branches and bark the larger limbs to avoid providing "nurseries" for Bark Beetles.

Renew all "shreds" and strands used to fasten the branches of wall-trained trees, for such pests as Red Spider Mites and Earwigs shelter among the ties.

Grease-band the trunks of all standard and half-standard fruit trees in early October to trap the wingless females of Winter and Mottled Umber Moths, and keep the bands sticky throughout the winter by removing all fallen leaves so that the spring-emerging female wingless March Moths are captured.

Trap-band the stems and larger branches of Apples and Pears with sacking or corrugated-paper bands to induce the caterpillars of the Codling Moth to pupate within their folds, and the Apple Blossom Weevil to seek shelter beneath them. Attach the bands in June, removing and burning them in October.

Chemical Control.—Apart from the routine spraying programme to which reference has been made, a simple method of destroying colonies of Woolly Aphis or American Blight is to dab them with a stiff brush dipped in methylated spirit (*not* paraffin) or to pass along the trunk and branches the flame of a painter's blow-lamp.

General Conclusions.—The measures herewith outlined are subsidiary to spraying—an operation, however, which a great many owners of small gardens are unable to carry out owing to initial costs. The several cultural and mechanical methods referred to are simple, readily performed, and of sufficient merit to warrant their application to reduce the losses due to pests. These operations may be performed during the winter months by the veriest novice who, by completing them, will have the satisfaction of increasing food production and of being neighbourly by not allowing his trees to become a breeding ground for pests.

Clean cultivation should be practised by all gardeners, for to disregard hygienic principles will result in epidemics which may well be averted if the measures outlined are completed.

The author is indebted to his colleague, Mr. F. C. BROWN, for the photographs illustrating these notes.

THE AWARD OF GARDEN MERIT.—LXI.

281. FUCHSIA MAGELLANICA VAR. RICCARTONII.

Award of Garden Merit, November 28, 1927.

In most localities in Britain, save the very coldest, this *Fuchsia*, or one of the several similar varieties of *F. magellanica*, may be successfully grown in any garden in the open air; where the winter is long and cold and sunshine lacking, the protection of a south or west wall may be necessary. Its needs are few and simple. It appears to have no objection to chalky soils, though woodland with peat or leaf-mould is not so much to its liking; it enjoys sunshine and fresh air, especially sea-air, and in gardens round the coasts of these islands can be seen in the most flourishing state, growing 15 to 20 feet tall with a trunk-like stem and light brown flaky bark, and even producing self-sown seedlings. More often is it used as a hedge, when under moderately

favourable conditions it can easily reach 7 to 10 feet, forming a dense and picturesque screen in late summer, the flowers appearing for about three months from late July onwards until October or November if weather permits. In more severe climates, as at Wisley, the plants may be cut to the ground by frost in winter, but in the course of the following year will spring up again from the base to 4 feet in height and flower on the young shoots.

Hedges should be clipped or pruned in spring so that the flowering season is not spoiled later in the year. Cuttings taken in summer or early autumn provide a simple and easy means of propagation, either with or without a little heat in a frame or under a cloche.

F. magellanica is a native of Peru and Chile, from which latter country it was introduced to Kew in 1788 by one Capt. FIRTH, and depicted in vol. 3 of the *Botanical Magazine* in 1790, unfortunately under the erroneous title of *F. coccinea*, which is a distinct Brazilian plant. The variety *riccartonii* is said to have been raised from seeds of the type at Riccarton, near Edinburgh, soon after 1830. The earliest reference to it is in the first volume of *The Gardeners' Chronicle* (1841), where as *F. Riccartonia* there is a note of it having been planted at Aigburth, near Liverpool, in 1838. By 1851 it was recorded in the same journal as having reached a height of 14 ft. in another locality. REHDER gives the date of introduction as 1835.

The chief characteristics of the plant are these.

Young shoots, petiole and often the midrib of the leaf tinged red on the upper side, minutely downy like petiole; leaves borne in pairs or threes at each joint, ovate-lanceolate, generally $1\frac{1}{2}$ to $1\frac{3}{4}$ inches in length and about $\frac{3}{4}$ -inch in width, tapering at both ends but especially to the curved apex, upper surface dull, lower shining, margin having 6 to 9 short projecting teeth. Flowers pendent on slender pedicels usually as long or longer than leaves; ovary cylindrical, shining brown, about the same length as the swollen calyx-tube, which, like the sepals $\frac{7}{8}$ -inch long and more than $\frac{1}{4}$ -inch wide, divided almost to the base, and the stamens and style, are Turkey red (H.C.C. 721/2) in hue, the petals Tyrian purple.

B. O. M.

282. FUCHSIA MAGELLANICA VAR. GRACILIS.

Award of Garden Merit, October 27, 1930.

In comparison with var. *riccartonii* this is a smaller, more elegant, but less vigorous shrub, the leaves of similar size and shape but on somewhat longer petioles, frequently thinly and softly hairy beneath especially along the midrib, the shoots rather densely hairy. Pedicels very slender, with a sparse pubescence which extends to the narrow ovary and semi-cylindrical calyx, the elongated tube of the latter longer than the former; sepals 1 inch long, less than $\frac{1}{4}$ -inch wide, tapering gradually to a sharp point, Carmine (H.C.C. 21/1). (Fig. 6.)

The first description of this variety appeared under the heading of *F. decussata* in the *Botanical Magazine*, t. 2507, in 1827, but as this name had already been used for a Peruvian species it was superseded by LINDLEY's name, *F. gracilis*, which was published in the *Botanical Register*, t. 847, in the same year. Both plates show the typically long and narrow sepals and slender pedicels, but the colouring in the *Botanical Magazine* is more accurate.

This variety was, according to the latter, raised at the Botanic Garden, Edinburgh, from seeds sent from Chile in 1822 by Mr. CRUIKSHANKS. The later statement by LINDLEY that it was of Mexican origin is evidently erroneous, and confirmed by Prof. W. B. HEMSLEY in his account of Fuchsia species in *The Garden* in 1877, that *F. gracilis* did not agree with any Mexican form and was just as hardy as the *F. magellanica* group. This is also the case at Wisley at the present time, where although cut to the ground each winter it grows up again in the following summer.

There is a variegated form recorded in our PROCEEDINGS in 1862, and this is still in cultivation, though less attractive than the ordinary variety.

B. O. M.

283. CORNUS FLORIDA VAR. RUBRA.

Award of Garden Merit, October 4, 1937.

Cornus florida owes its decorative value to the large involucre bracts which surround the close heads of little greenish-yellow flowers; these bracts, four in number, are broadly ovate, about 2 inches long and, in the type, white; in the variety to which the Award has been given they are rosy-red; after enclosing the flower head during the winter they expand in May and develop then their full colouring. *Cornus florida* var. *rubra* forms a small spreading tree about 10–20 feet high; the deciduous leaves are ovate, variable in size up to 6 inches long by 3 inches wide, dark green above, and rather pale below. It is a native of the eastern United States from Massachusetts southwards and though it can stand considerable cold, it is apt to be caught by late spring frosts in this country; the var. *rubra* appears to be rather hardier than the type.

The plant was introduced early in the eighteenth century; it was growing at Hoxton in 1730 and probably at the Chelsea Physic Garden in 1739, but has never been very widely cultivated here, though the beautiful colours developed by the leaves in autumn make it a valuable plant, apart from its spring display. It is illustrated in the *Botanical Magazine*, t. 8315.

HYGIENE IN THE WAR-TIME VEGETABLE GARDEN—XI.

By D. E. GREEN, M.Sc., Mycologist, Wisley.

IN these articles on vegetable diseases it will be noticed that the same disease may attack many different kinds of root crops—*e.g.* Black Rot of Cabbage, *Pseudomonas campestris*, can also affect Turnips, Swedes, Radishes, etc. Sometimes the symptoms of the same disease show a great difference in severity according to the plant attacked—*e.g.* Scab, *Actinomyces sp.*, is hardly noticeable on Turnip, but may be an obvious disfigurement on Radish or Beetroot.

HAMBURG PARSLEY.

We must first mention Hamburg Parsley, which seems to be gaining favour and will perhaps be welcomed as a substitute for Parsnips by those people who do not like the latter vegetable. It is easily grown and there are not many records of diseases affecting it, but no doubt it can be affected by the few troubles recorded on Parsnips. Certainly the one known as Canker occurs on Hamburg Parsley, and the remedial measures are the same as given for Parsnip (see R.H.S. JOURNAL, November 1941).

TURNIP AND SWEDE.

CLUB ROOT, OR FINGER AND TOE.

This disease is well known owing to its widespread occurrence on members of the Cabbage tribe, and it has already been discussed in a previous article on Cabbage diseases (see R.H.S. JOURNAL, March 1941, p. 91), in which the name of the parasite and various local names used for the disease are mentioned.

On Turnips and Swedes the symptoms of Club Root are much the same as for Cabbages, in that the actual roots below the edible part of the Swede grow misshapen and swollen so that the fibrous roots appear like gnarled fingers and toes. This must not be confused with the rather similar but, in general, more rounded and smaller growths which occur on some varieties of Swedes and are known as "hybridization nodules." The flesh of the swollen club root when cut is somewhat mottled and will rot away, while the flesh of the hybridization nodules when cut is not mottled and the nodules do not rot but will remain firm. The origin of these nodules is still something of a mystery, but they do not seem to harm the plant. There are also small rounded galls which may be seen on Turnips, Swedes and Cabbage roots, due to the insect known as the Turnip Gall Weevil, but these are easily distinguished from true Club Root disease by the fact that

when cut across the maggot is either still inside, or has eaten its way out and has left an obvious hole in the centre of the gall.

In the case of true Club Root on Turnip, etc., the remedy, as with Cabbages, is to counteract it by proper liming of the soil. After a diseased crop this is the first thing to do, and in severe attacks 28 lbs. of freshly slaked burnt lime per square rod may be applied, but usually 14 lbs. is enough. The kind of lime is important, for it is essential that the dressing be intimately mixed with the soil, and finely divided lime is, therefore, the best. Freshly slaked burnt lime, good ground lime, or hydrated lime, about 20 lbs. per rod, are good in this respect, but chalk or ground limestone needs to be applied in much larger quantities. It must not be expected that the result will be immediate, and a year or more may elapse before good results are obtained. Yet the liming is worth doing and should be done well—*i.e.* finely divided lime should be evenly spread and raked or dug in so that there is a good even mixing with the top soil. Nor must the importance of rotation of crops be lost sight of, and if possible cruciferous crops ought to be kept off the infected ground for as long as possible—all such practices helping to eliminate the Club Root parasite.

One more point that is interesting is the possibility suggested by some scientists that the Club Root parasite may possess different physiological strains, so that Cauliflowers may be severely attacked in ground where Swedes are not affected, while in another place Swedes may be very badly attacked. Many readers will have seen severe Club Root on members of the Cabbage tribe in their gardens, whereas no such trouble is present on Turnips, Swedes, Radishes, etc. Nevertheless, this point makes little difference to the necessary remedial measures which are indicated above and which should be followed at any sign of this trouble. In any case, proper liming is good garden practice and needs no emphasis.

BLACK ROT.

Black Rot disease in Turnips and Swedes is caused by the organism known as *Pseudomonas campestris*, and the symptoms are easily seen because there is a dark brown or black discoloration of the vascular system. When an affected Turnip is cut across the flesh shows small black spots arranged closely in concentric rings so numerous that the whole of the affected area is darkened brown or black, and there may be in some cases a hollowed-out cavity as well. On such plants the foliage is likely to yellow off. This disease also attacks Cabbages and Seakale, causing distinct blackening of the veins, so that the rings of blackening are easily seen in Cabbage stems or Seakale roots when cut. The disease is most prevalent in hot weather, and crops grown during the cooler weather are not usually attacked. Whenever the disease is experienced great care should be taken to destroy the affected plants so that as far as possible no infected leaves or other plant debris is left on the soil.

SOFT ROT.

Soft Rot of Turnips and Swedes is caused by *Bacterium carotovorum* (already mentioned for Celery Heart Rot in R.H.S. JOURNAL, April 1941, p. 135, and on Onion, R.H.S. JOURNAL, September 1941, p. 329). It causes a white or whitish-grey soft mushy rot (Fig. 9) which in wet seasons may destroy many plants. The trouble generally starts in the crown or in the base of the leaf stalks, where the tissues appear grey or water-soaked, so causing the leaf to drop and the stem to become soft and slimy. In some cases the parasite may enter through an injury on the side or even the base, or through a growth crack (see later) before it heals, but usually the trouble starts at the top. Soon the flesh is broken down into a putrid mass, but the rind remains intact and often affected roots are found hollow with a dry skeleton of vascular tissue (veins) remaining inside the empty rind. When this disease appears it is essential to remove the first affected plant and perhaps its nearest neighbours, and to avoid breaking the leaf stalks of any of the other plants. In wet seasons incidental damage such as dogs or poultry running between Turnips or Swedes may encourage much loss from Soft Rot by such leaf-breaking. Slug damage may occasionally help to start this rot. As with Black Rot, it is essential to remove all infected material from the site where the disease occurs. Neither should Turnips be grown on that site the following season.

DRY ROT.

Dry Rot due to the fungus parasite *Phoma Lingam* is not common and is more likely to be found on Turnips and Swedes in farm crops than in gardens. This fungus may also cause Black Stem in Cabbages (see R.H.S. JOURNAL, March 1941, p. 93) and can be seed borne, but the evidence at hand suggests that infection is more likely to come from refuse left in the soil from a diseased crop. The signs are that pale yellowish oval spots show on the side of the root. These become sunken and increase in size as the affected tissues dry, and soon gaping cracks appear horizontally across the diseased part and the whole root rots. Although not a common disease it is best to pull up and burn any root seen to have this type of rot.

POWDERY MILDEW.

This is the common mildew known to most people when it appears as a whitish powdery coating in spots or sometimes all over the leaves. It is most noticeable on the older leaves, especially in a dry season, the reason perhaps being that the crop suffers from dryness at the roots, yet heavy dews enable the parasite to keep growing. This parasite is the fungus *Erysiphe polygoni*, which is responsible for mildew on many kinds of plants, but the fungus possesses different strains so that the mildew on Swedes and Turnips is not likely to affect Peas, etc. (see under Peas in R.H.S. JOURNAL, March 1941, p. 94). In any case this mildew on Turnips or Swedes as a rule can be ignored.

DOWNY MILDEW.

This is a different mildew from the last mentioned and may cause damage to the young plants. It is caused by the fungus *Peronospora parasitica*, and is seen as whitish mealy patches on the under surfaces of the leaves, so that these parts show yellowish on the upper surface. In a wet season the young plants may be damaged, but if the plants are not overcrowded and thinning is done early and properly, the trouble should not be of much consequence.

LEAF SPOTS.

Certain leaf-spotting fungi sometimes appear on Turnip or Swede foliage and cause brown or white spotting of the leaves—e.g. Brown Spot due to *Alternaria Brassicae*, White Spot due to *Cercospora Brassicae*; but even when fairly heavily spotted there does not seem to be much interference with the general health of the plants, and with good soil conditions the resulting crop of roots is usually satisfactory.

WHITE BLISTER.

This disease is due to the fungus *Cystopus candidus*, which also causes White Blister on Brassicas (Cabbages and Brussels Sprouts especially), and has been described already under Cabbage (see R.H.S. JOURNAL, March 1941, p. 93). It may appear as rings of glistening white raised pustules on the foliage of Swedes and Turnips, especially in the seedling stage, but, provided the plants are given enough room to grow, it should not be of any importance.

SCAB.

As the name implies, this disease shows as scabby areas on the skin of the root similar to that caused in Potato Common Scab (see R.H.S. JOURNAL, January 1941, p. 30) and caused by the same parasite, viz. *Actinomyces scabies*. In Turnip and Swede this scab usually cannot be considered to be more than a slight external blemish, so need not be considered here, and will be discussed more fully under Radish and Beetroot, which are sometimes more severely attacked.

VIRUS DISEASE.

In some other countries Turnip and Swede leaves are known to suffer to some extent from a mosaic type of virus which shows as a pronounced mottling with light yellow areas on the leaves, and there may be some stunting of the plant. Up to the present, however, although very similar symptoms may occasionally be seen here, there is no information on the presence of this virus in Great Britain. In any case, even in those countries where it is seen, the effect on the plant is said to be very slight.

CRACKING.

Growth cracks may occur in Turnips or Swedes on the side or even underneath the root. Very often these heal up and provide themselves with a new skin (Fig. 10), but at times the crack is speedily invaded by rotting organisms (*e.g.* Soft Rot, *Bacterium carotovorum*, already mentioned) which will destroy the root entirely. As these growth cracks are induced by uneven growth, any work done in preparing the soil and keeping it in good heart helps to promote steady growth and is of great importance.

BROWN HEART.

The condition known as Brown Heart, Black Heart, Dark Centre, Raan, etc., in Turnips or Swedes is not the work of any parasite but is due to some unsuitable factor in growth. (Various names—*e.g.* functional disorder, non-parasitic disease, physiological disturbance—are used to describe this sort of trouble, and instances of several kinds have been mentioned and described on other plants during the course of these articles.)

It is unfortunate that Brown Heart in Turnips or Swedes cannot be seen outside the root, for there is no external sign of its presence and the foliage looks normal. On cutting the root, however, the flesh shows fairly clearly defined areas which are greyish or brownish in colour—the shape of the whole pattern may be indefinite or the areas may be roughly concentric (Fig. 11). This appearance is usually (not always) found in the lower two-thirds of the root and varies according to the severity of the trouble. If it is severe, small cracks may be present in the darkening areas, but in any case once present it is likely to get worse as the season goes on.

The affected plants are not smaller in size nor do they rot, and as already stated the symptoms can be seen only by cutting the root either lengthwise through the centre or horizontally across somewhere in the lower half. Such affected roots are not suitable for eating and will cook hard, stringy and tasteless.

The cause of this trouble is said to be that the plant suffers from a lack of the element boron. This can hardly be called a plant food, for it is required by the plant in very small quantity indeed and must certainly not be applied to the soil in large amount. There may be more than one reason for this boron deficiency, one being actual shortage of boron in the soil, while another is that a heavy dressing of lime may by chemical reaction have the effect of making the boron unavailable to the plants. It is well known that over-liming may cause several kinds of troubles which may be a nuisance in the season following the treatment, but which will gradually disappear. Other factors that must be remembered are the type of soil and the season. Brown Heart is mostly found on the lighter kinds of soil which have free drainage so that heavy rain washes through them easily and they soon get acid, also they quickly feel dry periods so that the plants

suffer drought. All such factors, especially drought, help to encourage the appearance of Brown Heart in Swedes and Turnips. While it is necessary to supply lime, this is best done in light dressings and regularly. A very important point is to endeavour to supply organic matter so as to keep up the supply of humus which will help in supplying plant food and will conserve moisture during dry weather.

Where the trouble is severe boron can be applied in small quantity, viz. $1\frac{1}{2}$ oz. per square rod. This is bought in the form of borax, and should be carefully and thoroughly mixed into a carrier such as perfectly dry sand or soil equal to perhaps ten or twenty times the amount of the borax so that distribution on the soil is better. The small amount of actual boron is considered to be the cure for Brown Heart on boron-deficient soil. As previously mentioned, however, it is necessary not to lose sight of the importance of providing manure (humus) as a precaution against drought and of carrying out other good garden practices so that the plants are helped as much as possible to grow steadily all the time. The yellow and white Swedes and Turnips are considered to suffer less than the purple Swede, but occasionally the trouble is seen to cause a fair amount of loss in garden Turnips.

STORAGE ROTS.

Where Swedes or Turnips are stored in clamps the most likely diseases are Soft Rot, *Bacterium carotovorum* (see above), and Sclerotinia rot due to the fungus *Sclerotinia sclerotiorum*, which has already been described on Carrots. The precautions against such rotting in storage are the same as those recommended for Carrots, under which they have been fully discussed (see R.H.S. JOURNAL, November 1941).

DAMPING OFF.

In common with many other vegetable seedlings, young plants of Turnip or Swede may occasionally suffer from Damping Off caused by the attack of such fungus parasites as *Pythium de Baryanum* and *Corticium (Rhizoctonia solani)*. Such an attack is usually encouraged and aggravated by unsuitable soil conditions, probably wetness, and if fresh organic matter such as leaf-mould or vegetable rubbish in a fresh state has been recently dug into the ground the parasitic fungus may have been introduced in quantity. In very wet conditions these fungi thrive and attack the roots of young plants, especially if they have received a check due to adverse weather conditions. This kind of disease has been mentioned under Carrots (see R.H.S. JOURNAL, November 1941, p. 417), but emphasis is again laid on the advisability of good cultivation such as deep digging, etc., so that the drainage and general soil conditions are satisfactory.

KOHL-RABI.

This vegetable deserves to be grown more and is fairly easy to grow. It is said to be very suitable for the lighter types of soil where

summer Turnips do not do well. In all probability it is subject to most of the common diseases of Brassicas, but the chief ones likely to attack it are Club Root, *Plasmodiophora Brassicae* (Fig. 12) (see under Cabbage, R.H.S. JOURNAL, March 1941, p. 91), Black Rot, *Pseudomonas campestris*, and Mildew, *Erysiphe polygoni* (see both under Turnip and Swede).

RADISH.

As may be expected, Radishes can be affected by almost all the diseases that attack Turnips, but on Radishes these troubles are not common nor are they very serious. The list includes Damping Off in seedlings (*Pythium* sp. and *Corticium solani*), Leaf Spot (*Alternaria Brassicae*), White Blister (*Cystopus candidus*), Powdery Mildew (*Erysiphe polygoni*), Downy Mildew (*Peronospora parasitica*), Club Root (*Plasmodiophora Brassicae*), Black Rot (*Pseudomonas campestris*), Dry Rot (*Phoma Lingam*), Scab (*Actinomyces scabies*), all of which have been described under Turnip and Swede. Although Radishes are not usually affected, one or two of these diseases when present can be very annoying, and we mention Club Root and Scab. Club Root has already been described under Cabbage (R.H.S. JOURNAL, March 1941, p. 91), and under Turnip above.

SCAB.

As already stated, this disease on Turnips is hardly worth mentioning, but on Radish it can sometimes be severe and the root is almost covered with typical scabs which spoil its shape and appearance (Fig. 13). The reasons for a severe attack are to be found in the soil in which shortage of organic material (humus), no doubt, aggravates the disease. Such "hungry" soils are most likely to produce Scab, but there is also the possibility that high infection of the soil by the scab fungus (*Actinomyces scabies*) also exists. It is possible that after a crop of Potatoes which have shown severe scabbing, a succeeding crop of Radishes may be affected by Scab unless the soil is improved by digging in ample supplies of organic material. It must not be forgotten, however, that such factors as heavy liming or prolonged dry weather may play their part in encouraging Scab.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1941.

Brassolaellocattleya × 'A. Merry.' A.M. November 4, 1941. This elegant hybrid bore a spike of three large and well-formed flowers, the sepals and petals light rose colour, the expansive labellum rich purple with a crisped margin. The result of crossing *Brassocattleya* × 'British Queen' with *Laeliocattleya* × 'Ishtar.' Exhibited by Capt. the Hon. H. R. Broughton, Bakeham House, Englefield Green, Surrey. See p. iii.

Carnation 'Spitfire.' A.M. November 4, 1941, as a perpetual flowering variety for exhibition and market. Shown by Mr. F. Hicks, Embrook Nurseries, Wokingham, Berks. Plant of good bushy habit, producing a succession of flowers, with long stiff stems. Flowers $3\frac{1}{2}$ inches diameter, full centred, light salmon-pink, flaked and speckled with bright red; petals broad, stiff, somewhat serrated; calyx strong. See p. iii.

Chrysanthemum 'Evelyn.' A.M. October 15, 1941, as an early flowering variety for show purposes. Flower stems stiff, 18 to 24 inches long, clothed with medium-sized foliage. Flowers double, 5 inches across, incurved with stiff broad petals, bright clear yellow. Raised and shown by Mr. H. Shoesmith, Mayford, Woking. See p. i.

Cypripedium \times 'Red Knight.' A.M. November 4, 1941. A well-balanced flower in which the showy dorsal sepal is flushed with rose colour and profusely spotted with crimson. The broad petals are mahogany-red. The result of crossing *C. \times 'Marion'* with *C. \times 'Redstart.'* Raised and exhibited by Messrs. H. G. Alexander, Tetbury, Glos. See p. iii.

Euonymus Bungeana. A.M. November 4, 1941. An attractive deciduous shrub or small tree 10 to 15 feet high, native of Manchuria and Northern China. The slender arching stems branch freely, producing many short, twiggy branchlets. These bear long-petioled, elliptic, acuminate leaves 2 to 4 inches long; and, from their lower portions, numerous forked cymes of inconspicuous pale green flowers. The fruits are $\frac{1}{2}$ inch across, 4-lobed, pale scarlet (H.C.C. 19/3), splitting when mature to expose the signal red (H.C.C. 719) seeds. Exhibited by the Director, R.H.S. Gardens, Wisley. See p. ii.

Laeliocattleya \times 'Snowdrift.' A.M. November 4, 1941. A charming hybrid bearing well-proportioned flowers, the sepals and petals pure white, the labellum having a bright purple front lobe and a yellow throat. The result of crossing *Laeliocattleya \times 'Cynthia'* with *Cattleya \times 'Annette.'* Exhibited by The Stuart Low Co., Jarvis Brook, Sussex. See p. iii.

BOOK REVIEW.

"Modern Fruit Production." By Gourley Howlett. 8vo. vii \times 579 pp. (Macmillan, New York, 1941.) 18s.

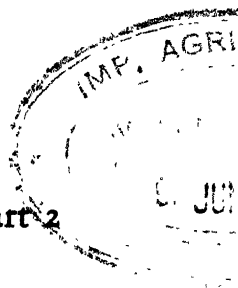
This is a specialist's book of American origin. In consequence it makes little appeal to our practical fruit growers, but it will be of great value to men engaged in the investigation of all problems, other than disease, connected with the growing of hardy fruits. After a general introduction on morphology and physiology chapters follow on soils and manures, cultivation and water supply and such special questions as propagation and stocks, pruning, fertilisation, thinning and storage, with a final chapter on breeding. In each case there is a discussion of the experimental work on the subject and a very complete bibliography, most complete perhaps as regards American work but not without due recognition of English and European investigation. Inevitably the consideration of varieties and of marketing questions is addressed to American readers; none the less the book should be in the libraries of all institutions concerned with the scientific aspects of fruit production.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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Part 2



February 1942

THE SECRETARY'S PAGE.

PROGRAMME FOR 1942.

THE Annual Meeting to receive the year's Reports will be held on the occasion of the first Show of the year on Tuesday, February 17, at 3 P.M. on the Society's premises. The Show will be a two-day Show and will be on Tuesday, February 17 (12 noon to 6 P.M.) and Wednesday, February 18 (10 A.M. to 4.30 P.M.).

The next Show will be on Tuesday, March 17 (12 noon to 6 P.M.) and Wednesday, March 18 (10 A.M. to 4.30 P.M.), and the Daffodil Show will be held on the occasion of the Monthly Show on Tuesday, April 14 (12 noon to 6 P.M.) and Wednesday, April 15 (10 A.M. to 4.30 P.M.).

Further notices of Shows will be announced from time to time on this page or in the Daily Press.

THE JOURNAL.

It is regretted that the January JOURNAL was late in appearance, but it was due to causes outside the control of the Society.

The January JOURNAL contained the application forms for the distribution of seeds and plants and it would be of great assistance to the staff if early applications could be made. It is to be remembered, however, that plants and seeds are only distributed to those who have paid up their subscriptions.

SUBSCRIPTIONS.

The subscriptions fell due on January 1. The Society is undertaking important work for the Government and the full support of

the Fellows and Associates is necessary to carry on the work of the Society and thus give its Fellows and Associates their privileges.

CATALOGUE OF RED CROSS POSTAL AUCTION.

In March the Society, in co-operation with the Red Cross Horticulture Committee, will hold a Postal Auction Sale in aid of the Duke of Gloucester's Fund for the British Red Cross and Order of St. John. The Catalogue, which will be published during the second half of February, will be divided into two sections, one consisting of horticultural sundries and the other of books. The horticultural sundries will include a great variety of garden requisites presented by the manufacturers. The books of which many hundreds of parcels have been sent to the Society's offices by Fellows and the Public, deal not only with horticulture and botany, but also forestry, angling, ornithology and entomology. His Majesty the King has graciously sent a valuable gift from the royal Library. The books will be on view at the Show held in conjunction with the Annual General Meeting on February 17th.

Postcards applying for the Catalogue of the Sale should be sent to the Secretary and it will be helpful if any Fellow who is particularly interested in the book section will mention the fact.

THE LIBRARY.

The Fellows and Associates are reminded that the Lindley Library is still functioning, and books can be borrowed and also the Library consulted on visit. Should a visit be contemplated, it would be as well to warn the Librarian beforehand of what books are required to be consulted as then much time can be saved by having them ready for the visit.

PANEL OF LECTURERS.

Fellows and Affiliated Societies requiring lecturers should make an early application to the Secretary.

DEMONSTRATION.

The first demonstration of the year, that of "Outdoor Seed Bed and Seed Sowing," will be held at Wisley on March 4 and 5 from 2 to 4 P.M. Should the weather not permit, arrangements will be made for an illustrated talk under cover. Fellows and Associates who desire to attend are requested to notify the Director, R.H.S. Gardens, Wisley, Ripley, Surrey.

R.H.S. DIARY.

The Royal Horticultural Society's Diary for 1942 is now sold out.

WISLEY IN FEBRUARY.

THE steadily lengthening days and increasing power of the sunshine evoke a rapid response among the many plants which throughout the winter have gradually prepared for the February display. In every part of the Gardens there will be found something of interest and beauty, from the small golden stars of *Crocus Susianus* to the old, impressive specimens of *Pieris japonica*. The comprehensive named collection of Dutch Crocus planted under the Apple trees near the Herbaceous Borders may be expected to make an attractive show.

At this time of the year the Alpine house is bright with pans of early-flowering bulbs and alpine plants. Irises are well represented by *I. histrioides*, particularly the fine violet-blue form named after its collector, Mr. G. P. BAKER; the smaller *I. histrio* and its delicate pale blue variety *aintabensis*; the bright yellow *I. Danfordiae*, and *I. reticulata*. The hybrid Winter Aconite *Eranthis* \times *Tubergenii* (*E. hyemalis* \times *E. cilicica*) is an excellent, free-flowering pot plant, but is equally useful for planting in the open, preferably among deciduous shrubs (see Fig. 16). A less common bulbous plant is *Scilla Tubergeniana* (Fig. 17), a comparatively recent acquisition from northern Iran. This has the habit of *S. sibirica*, with lasting flowers of palest mauve. The earlier Saxifrages, including the many varieties of *S. Burseriana*, *S.* \times *Jenkinsiae*, *S. Irvingii*, together with other species and hybrids of the Kabschia type are now displaying numerous white or delicately tinted flowers.

In the rock garden the earlier Snowdrops *Galanthus Elwesii*, *G. byzantinus*, the green-leaved *G. latifolius*, and many Crocuses, such as *C. aureus*, *C. Tomasinianus* and varieties of *C. chrysanthus*, have made an appearance. The spring Snowflakes, *Leucojum vernal* var. *Vagneri* and the equally attractive var. *carpathicum* with yellow tipped perianth segments are both to be seen growing vigorously in the bog garden, as well as in many other places where moist conditions of the soil are constant. *Primula Winteri* and *P. sonchifolia* may also be expected to be producing their flowers, the latter being still leafless and showing its egg-shaped, swollen winter-buds.

If the weather prove favourable, the earliest Rhododendrons should be in flower during February. *R. moupinense*, a low-growing species with white or pink-flushed bloom occupies a sheltered corner near the top of the alpine meadow, but it rarely escapes injury by frost. Another good early-flowering Rhododendron which has received the Award of Merit is *R.* \times *cilpinense*, a hybrid between the *R. moupinense* and *R. ciliatum*, as its name implies. Similarly the rosy-purple *R. dauricum* and its hybrid *R.* \times *praecox* require a mild spell to develop their full beauty. *Mahonia japonica* is a handsome evergreen shrub whose long, spreading racemes of scented yellow flowers are well set off by the large glossy leaves. This and its Chinese

variety *Bealii*, which differs in having erect flowering sprays, both flower for several weeks in the Wild garden, where also *Daphne Mezereum* combines welcome colour with fragrance. In several parts of the Gardens, the Witch Hazels (*Hamamelis*) are conspicuous in their fringed golden or yellow dresses. *H. mollis* is well represented by large and shapely specimens in Seven Acres and the Award of Garden Merit collection: *H. japonica* var. *arborea* and var. *Zuccariniana* grow in the border adjacent to the Vinery. *H. vernalis*, whose pale flowers cannot compete with those of the preceding, still has its value at this season.

In the Seven Acres, the Heaths deserve inspection. Among the many varieties of *Erica carnea*, 'Queen Mary,' 'King George' and the pink and white Springwood varieties are prominent, the last-named particularly fine with innumerable sprays of snow-white, brown-anthered bells. *E. × darleyensis*, notable for its extended flowering period, should find a place in every garden, large or small. *E. lusitanica*, most desirable for its soft green foliage and blush flowers, is susceptible to frost injury and therefore less reliable in many gardens. Another good garden plant of similar habit is *E. Veitchii*. In the extreme south-western corner of Seven Acres there is a group of the 'Winter Sweet,' *Chimonanthus fragrans*, perhaps more likely to betray its presence to the passer-by by the rich perfume rather than the subdued colour of its blossoms. At the time of writing these notes there is promise of abundant bloom. The variety *luteus*, of which there is a young plant near the wall facing the Iris collection, has larger and brighter yellow flowers.

Camellias are among the most attractive occupants of the Temperate house at present. *C. japonica magnoliaeflora* with pale pink, semi-double flowers, and the wax-like single *C. japonica* 'White Swan' flower freely every season, and the pink, Rose-like flowers of the small Chinese *C. maliflora* are also abundantly produced. The collection also includes the beautiful *C. saluenensis* and *C. reticulata*, and the closely related genus *Gordonia* is represented by a large specimen of *G. chrysandra*, with white, golden-centred flowers, while out of doors in the Wild garden numerous varieties of *C. japonica* are awaiting a spell of mild weather to enable them to expand their flower buds at a slightly later date. Species of *Acacia*, *Epacris* and *Erica* are still in flower, and the bright orange sprays of *Buddleia madagascarensis* continue to decorate the west side of the house. The tender Chinese species, *B. asiatica*, scents the atmosphere of this greenhouse with its long racemes of small white flowers.

THE WAR-TIME VEGETABLE GARDEN.

FEBRUARY.

Soils.—To grow good crops the soil must be fertile. Soil is the product of the decomposition of the rocky surface of the earth ; the larger particles consist of chemically inactive silica and, where they preponderate, the soil is said to be sandy ; the very fine particles, also of silica, but mixed with the oxides of iron, aluminium and other metals, constitute clay. Calcium carbonate may also be present in varying amounts. Where the surface has been exposed and plants have grown, another constituent is added to the top few inches—decaying plant material or humus. Air and water will also be present ; a sandy soil will contain a high proportion of air but will hold water with difficulty ; even a heavy clay has small interstices filled with air, but the deleterious effects of a water-logged soil are due to the absence of air rather than to a superabundance of water.

The fertility of the natural soil depends, therefore, on the proportion of sand, clay, calcium salts and organic material present and on its physical condition. The extreme types—pure sand or pure clay—are rarely met with ; the intermediate grades are known as loams, light or heavy, according to the amount of sand they contain.

Any soil can be made more fertile by suitable treatment, and by varying the proportions of the constituents ; thus organic material added to sand will increase the chemical contents and also assist in retaining water ; organic material added to clay helps to make it more open and thus improve aeration. Stable manure is the usual form in which organic material is added to the soil, but the supply was becoming limited with the increase of cars in place of horse-drawn vehicles and in war-time manure will be quite unobtainable in some areas. A very good substitute can be produced from garden rubbish ; all woody material or anything showing signs of disease should be burned and the ash used as a dressing for any crops that appreciate potash ; but all soft refuse should be piled together to form a compost heap and left to decay ; the addition every six inches of superphosphate and ammonium sulphate or of one of the proprietary materials available quickens the process. Every garden, however small, should have its compost heap in the making ; when vegetables are sent to the kitchen, the leaves of root crops and unusable outside leaves of other crops should be put on the heap unless required for pigs or poultry, and nothing allowed to find its way to the dustbin. The heap is required for use chiefly when digging and planting are being done, that is in autumn and spring ; if space permits, two heaps should be running concurrently, one building and one in use ; most garden refuse will have rotted sufficiently in about six months, but will be all the better if it can be left longer.

The sort of crop the gardener wants to take off his land makes heavier demands on the supplies of plant food than would the natural soil covering of wild plants ; it is, therefore, necessary to enrich the ground by the addition of fertilisers. Many soils are improved by the addition of lime, in the form of carbonate (*e.g.* ground-chalk or limestone), for most plants prefer a neutral or alkaline soil and decaying organic matter produces acids, but too much lime can be as harmful as too little. As it is slow in action lime should generally be applied in winter and never at the same time as organic manures, sulphate of ammonia or superphosphate.

The substances present in organic manure but liable to be deficient if the ground has carried heavy crops are nitrates, phosphates and potash ; these can be added separately, in accordance with the type of plant to be grown, but as an overdose can have serious effects it is probably better for a grower who does not fully understand the use of fertilisers to rely on a good general fertiliser in which the proportions of each ingredient are well balanced ; a number of such preparations are offered by the reliable horticultural sundriesmen.

Work to be done.—The first sowing of Summer Spinach, can be made in a favourable position such as a warm border, further sowings can be put in every three weeks ; Parsnips should be sown this month if the weather permits. Artichokes and Shallots should be planted if this has not already been done ; and seed Potatos should be set to sprout.

Frames.—(Preparations for the full use of frames and greenhouses for early crops should be made in early autumn ; details will be given later this year at the appropriate time.)—The last sowings of Carrots, Radishes, Lettuces and Turnips for early crops should go in ; Peas can be sown for transplanting out later, but these may not mature much earlier than the first sowing made out-of-doors in light soils, but in cold soils a distinct advantage is gained and they transplant well. Brussels Sprouts, Cauliflowers and Cabbages can be started under glass to bring them on early, or left to be sown in the open in March.

Greenhouse.—Onions and Leeks may be sown in heat for transplanting later, and this is advisable where the Onion fly is known to be troublesome. Tomatos and Cucumbers which are to be grown under glass should be sown now ; those to be planted out-of-doors do not need to be sown till later.

Crops available from the garden in February.—Artichokes, Brussels Sprouts, Celery, Kale, Leeks, Parsnips, Savoy, Spinach Beet. *From store :* Beet, Carrots, Onions, Shallots, Swedes, Turnips. Apples and Pears.

The Fruit Garden.—The mild weather which prevailed to the end of the year should have provided an opportunity to complete pruning and winter spraying. These operations finished, push ahead with the cultivation of the ground. This simply consists of lightly forking between the trees and bushes. In forking between the Soft Fruits do not go so deeply as to injure the roots which are very near the

surface of the soil. Pull out any weeds growing near the base of the bushes and bury in the centre of the row.

The question of maintaining a satisfactory potash content of the soil is going to be difficult now that potash manures are more or less unobtainable. If all wood ashes are saved these should serve to some extent to replace manures such as sulphate of potash, which are normally applied at this time. Keep the wood ashes dry and apply at the beginning of April when the bushes and trees are active. The reason for this late application is that the potash which wood ashes contain is readily available. Treat Raspberries, Red Currants, Gooseberries, Strawberries and Apples first as these kinds are more liable to suffer from potash deficiency than the other kinds of hardy fruits. Soft fruits on light soils will benefit from a mulch of farmyard manure. Cover the manure with a light dressing of soil to prevent birds scratching it about.

Strawberries are liable to be loosened with hard frost, so tread around the plants when the soil is reasonably dry in order to firm the roots. This advice also applies to newly planted trees and bushes.

At the end of the month tip the canes of summer fruiting Raspberries back to a uniform height of 4 ft. 6 in. to 5 ft. This is done in order to secure an even break. Prune autumn-fruiting Raspberries by cutting every cane down to ground level; it is the canes which are produced during the summer which bear fruit in the autumn. The summer-fruiting Raspberry on the other hand produces its fruit on the canes of the preceding year. Numerous complaints were received last year about autumn-fruiting Raspberries failing to mature fruit. This was no doubt partly due to the season, but it was also assisted by overcrowding of the canes. Far more canes are produced than can possibly bear fruit and it is necessary to remove the surplus ones early in the season, retaining only seven or eight of the strongest of the new canes to each stool. Burn all the prunings, they will make good wood ash. By the way, in raking together the Apple prunings the fallen Apple leaves should also be collected as the leaves are a source of infection of Apple Scab.

To control Peach Leaf Curl spray Peach and Nectarine trees just as the buds show signs of movement with Burgundy Mixture. Thoroughly wet every part of the tree, paying particular attention to the buds. Burgundy Mixture can be bought ready made or it can be made up at home (see R.H.S. Diary, p. 48).

Apple and Pear trees which it is intended to top graft should be prepared any time during this month. Cut back the branches to where sound clean bark exists; if the tree is large leave one branch intact. The object of this branch is to absorb excess sap when the tree commences to grow in the spring. Grafting is not done until the end of March and in the meantime keep the scions dormant by heeling them in under a north wall.

WILLIAM AND THOMAS LOBB :
TWO CORNISH PLANT COLLECTORS.

By the Rt. Rev. J. W. HUNKIN, Bishop of Truro.

IN the middle of the last century the firm of VEITCH was famous for the introduction into England of new plants collected by their travellers in America and Asia. The history of the rise and progress of the VEITCH nurseries is told in a handsome volume published in 1906, under the title *Hortus Veitchii*. The volume contains short lives of the plant collectors employed by the firm, twenty-two in all ; and the first two are WILLIAM LOBB (1840-1857) and THOMAS LOBB (1843-1860).

WILLIAM.

Mr. F. HAMILTON DAVEY, in his book on the *Flora of Cornwall* (1909), states that WILLIAM LOBB was the son of a gamekeeper on the Carlew estate, and was born in the parish of Perran-ar-worhal in 1809. I have had the Baptismal Register of Perran-ar-worhal searched, but there is no entry corresponding to this date. THOMAS LOBB was buried in Devoran Churchyard on 3 May, 1894, at the age of seventy-six, so he must have been born in 1818. There is no entry in the Register corresponding to this date either. The Register does, however, contain an item :

William Lobb, son of James and Dorothy Lobb, baptized 8 Sept. 1816.

If this refers to the plant collector, the date of his birth would seem to be 1816 rather than 1809 ; in which case he would be two years, and not seven years, older than his brother THOMAS. But very likely the entry refers to some other WILLIAM LOBB ; for a number of LOBBs were living in the parish about that time, and the name LOBB occurs in the Register fairly frequently.

Hortus Veitchii does not mention the fact that WILLIAM LOBB was employed in the garden of Scorrier House by the grandfather of its present owner, Mr. JOHN WILLIAMS, but I have it from Mr. WILLIAMS himself. WILLIAM was a smart boy, and his employer, perceiving his ability, encouraged him to go to VEITCH'S.

There is reason to suppose that the father of the two brothers died while they were still young, and Sir CHARLES LEMON, his employer, was very kind to the boys. Certainly THOMAS, in his old age, used to speak of Sir CHARLES with gratitude and affection.

WILLIAM, similarly, retained an attachment to the WILLIAMS family at Scorrier, and used to send seeds there as well as supplying the firm of VEITCH for whom he was travelling.

In 1837 both brothers were employed in Mr. JAMES VEITCH'S Nursery at Killerton, near Exeter. In that year the firm sent WILLIAM back to

Cornwall to be gardener to Mr. STEPHEN DAVEY of Redruth, grandfather of Mr. JOHN WILLIAMS on his mother's side. Here WILLIAM remained three years.

His first voyage westwards in 1840 took him to Brazil, and the first parcel he sent home contained the beautiful evergreen climber *Dipladenia splendens* and the evergreen shrub with violet-blue flowers *Hindsia violacea*. From Brazil he went to Chile, and in the great Araucaria forests of the south he collected a large quantity of the seeds of *Araucaria imbricata*. Some he sent to Scorrier, and a plantation of *Araucaria imbricata* appeared on the estate, which was subsequently burned down.

In 1844 WILLIAM returned to England, and the following year went to Chile again. This time his success was remarkable, and among his introductions were *Berberis Darwinii*, *Desfontainea spinosa*, *Embothrium coccineum*, *Escallonia macrantha* and *Philesia buxifolia*.

From plants of the last named, grown at Scorrier, Canon A. T. BOSCAWEN received a supply and produced the largest specimen in Europe. This has suffered severely in the unusual frosts of recent winters but is still alive.

On the same expedition LOBB collected seeds and plants of four very interesting Conifers: *Libocedrus tetragona*, *Fitzroya patagonica*, *Saxegothaea conspicua* and *Podocarpus nubigena*. In the garden at Scorrier are still to be seen a *Fitzroya patagonica* (now about 40 feet high) and a *Podocarpus nubigena* (now 60 feet high), sent home by LOBB.

He returned to England in 1848, and DAVEY thinks that it was during this furlough that he helped Mr. F. P. PASCOE with his list of Cornish plants, contributing two new records (*Lathyrus Nissolia* and *Viburnum Lantana*).

Next year LOBB went to California and made excursions to Oregon and the Sierra Nevada. Here he obtained and sent home cones and seeds of a number of valuable trees. In Scorrier garden these were represented by the beautiful *Thuia gigantea*, called after him *Lobbii*, *Abies grandis* and *A. concolor*, also by far the finest *Torreya californica* in Europe. LOBB brought home with him at the end of the year 1853 the first cones and seeds of *Sequoia gigantea* to be received in England. An avenue of these splendid trees was planted at Scorrier, but it has since disappeared. The soil somehow did not altogether suit the trees and they all died when they were about sixty or seventy years old.

Sequoia gigantea was called *Wellingtonia* by LINDLEY. This is generally taken to be after the DUKE OF WELLINGTON, who had died 14 September, 1852. But it is to be noted that the LOBB family were then living in a cottage at Wellington Place, near Devoran (so called after its owner, a Mr. JOHN WELLINGTON); and it is possible that this circumstance may have had something to do with the choice of the name.

The above list contains only a selection of LOBB's introductions.

We must add *Tricuspidaria lanceolata*, *Ceanothus Veitchianus*, *Dendromecon rigidum*, *Myrtus Ugni*, *Mitraria coccinea*, *Fuchsia spectabilis* and *Gloxinia speciosa*, parent of lovely strains grown to-day; also the less familiar *Gaultheria ferruginea*, *Lomatia ferruginea* and *Leucothoë Davisiae*; and there are a number of others.

British gardeners must always be grateful to WILLIAM LOBB not only for his original introductions, but also for making available through VEITCH'S Nurseries a number of other beautiful plants not hitherto entirely unknown but not distributed to British gardens, e.g. *Abutilon vitifolium* and *Fremontia californica*.

LOBB returned to California in the autumn of 1854 and continued to collect for VEITCH'S till 1857. His engagement with VEITCH'S then terminated, but he remained in California till his death at San Francisco in the autumn of 1863. His grave is in Lone Mountain Cemetery.

THOMAS.

In compiling these brief records I have had the valuable help of Mr. HOWARD T. MICHELL, who, as a boy, lived at Devoran and used to know old Mr. THOMAS LOBB in his retirement. Mr. MICHELL thinks that the two brothers LOBB were born in a cottage on the side of the hill at Perran Wharf; and he clearly remembers the great regard in which THOMAS held Sir CHARLES LEMON. SIR CHARLES was himself a botanist and an exhibitor at various shows of the Horticultural Society at Chiswick and the young LOBBS were employed in his stove houses at Carclew and encouraged in the study of plant cultivation.

By an agreement, dated 11 January, 1843, THOMAS undertook to proceed to Singapore and thence to China, or failing that to Java, to make collections of living plants, seeds and dried specimens of plants "for the said James Veitch & Son and for no other person." Is there a glance here at his brother WILLIAM'S donations to his friends? At all events THOMAS went to Singapore and thence to Java. Here he collected Orchids, and his first consignment home contained the fine Orchid not previously known in England *Phalaenopsis grandiflora* and *Vanda suavis*.

In accordance with a second agreement he went in 1848 to the Khasia Hills, North East India and Lower Burma, where again he discovered a number of striking Orchids, e.g., *Cypripedium villosum*. J. D., afterwards Sir JOSEPH HOOKER, was leading a botanical expedition in North India at the same time and in one of his letters there is a humorous reference to meeting LOBB. "Yesterday," he wrote, "THOMAS passed me with his 'circus'."

Afterwards he visited Malay and Borneo, whence he introduced the original forms of the Rhododendrons known as *javanico-jasminiflorum* hybrids, *R. javanicum*, *R. Lobbii*, *R. jasminiflorum*, *R. Brookeanum*, as well as the beautiful, though tender, *R. Veitchianum*, which has flowered magnificently at Tresco, in the Isles of Scilly; also some of

the first *Nepenthes* cultivated in British gardens, such as *N. Veitchii* and *N. sanguinea*. He also made a very fine collection of herbarium specimens, a list of which is given in HOOKER'S *London Journal of Botany* (1847-1848).

In the small Order *Aristolochiaceae* (to which the plant popularly known as 'Dutchman's Pipe' belongs) a genus has been called *Lobbia* after the two brothers.

"In manner," says Mr. JAMES VEITCH, "LOBB was modest and retiring, of few words, and it was difficult to get him to describe a plant, but if he ventured on calling it 'very pretty,' it was quite sufficient to induce extra care."

As a result of exposure, Mr. VEITCH adds, LOBB lost one of his legs, and so he came to settle at Devoran about 1860. He lived by himself in a cottage, now called Stanley Villa, almost as a recluse for many years. The house was always spick and span, but what LOBB did with his time remains a mystery. He had a number of drawings, both in black and white and in colour, of Orchids growing on the trees in Java; and Orchids were one of his few topics of conversation. He had a white Camellia in his garden and he used to give a flower to young MICHELL when he came on his weekly errand, so that he might wear it in the parish choir on Sunday. No inscription is to be found on his grave in Devoran churchyard, but through the efforts of Mr. MICHELL and his sister Mrs. SHORT, Mr. GEORGE DUNGEY, formerly sexton, and the present Vicar, the Rev. YEO WARD, the spot has been identified. I am proposing, therefore, to raise a little fund to provide for the erection of a small stone or tablet commemorating both THOMAS and his brother WILLIAM and for beautifying the churchyard in their honour by planting, say, *Berberis Darwinii*, *Escallonia macrantha* and *Tricuspidaria lanceolata*, three of their most familiar introductions.

APRICOTS.

By LADY MARTINEAU.

AN article in the R.H.S. JOURNAL of October 1941 spurs one on to write one's own observations of this delicious fruit in many countries over many years. As a child, I recall the farmhouse, whose walls, in North Wales, were covered with them, and our walled garden with fruitful trees, whose best fruit was always kept for "the master." The soil was on limestone. Later on I stayed in an Oxfordshire village, Islip, and fine Apricots grew on every cottage—again a limestone soil and near enough to the River Cherwell for the soil to be rich and fertile, with possibly a high water table. The cottagers said that the constant treading of the paths kept the roots in order!

In France (Dinard) Apricots were grown as standards; the soil contained lime but the fruits, which had never been thinned, covered

the trees and were small. The owner said he kept the walls for Pears as they were too hot for Apricots (and Peaches) with their thinner skins. Certainly they failed on our walls in Berkshire, dying off gradually in a few years, and we found that animal manure was fatal.

In 1920 I may say I met the perfect Apricot for the first time, in Roumania, where the soil was the alluvial deposit of the Danube and full of lime. Large trees in the open carried crops of fruit like big Oranges, full of juice and of exquisite flavour. The climate of that country is one of great extremes of heat and cold and the fruit was ripe in June, as were the yellow Cherries that birds will not touch.

In 1925 I found Apricots in Chile that were almost as good as in Roumania and, as grown in private gardens, were like golden balls of juice. Here irrigation was used where possible. The late WILLIAM ROBINSON claimed that Apricots *must* be on their own roots to succeed, so that I was interested to learn from Lady LORRAINE when in Egypt that whether grafted or on their own roots, it made no difference there. "They all die back when their roots reach the water-table of the Nile."

At one time Apricots succeeded well on the west coast of Scotland, but perhaps because of some change in climate in the last hundred years they no longer flourish.

Alas! my observations do not lead to any very definite conclusions. I can only say that the best trees I have seen were grown as large orchard trees, in fertile soil containing lime and in full sunshine. That the fruit on the standard trees at Dinard was of small size was either because the soil was not very good, though calcareous, or because quantity for the French markets was desired rather than quality. The extremes of heat and cold must also be taken as a factor. In Chile the great power of the sun is tempered by the cold Humboldt current (the sea being never warmer than 33° F.) and the cool airs from the Andes. Until recently I was unaware that grand crops of Peaches could be taken from big standard trees, but there are some five or six of these in a Byfleet garden growing on a sheltered slope where 2,500 Peaches, some weighing half a pound, had been gathered the summer before I saw them. They were never pruned but had branches thinned out occasionally. Why should not Apricots be treated in this manner? I have never seen a standard Apricot in this country and perhaps the fact of not pruning would prevent the gumming that is so general.

THE BERMUDA EASTER LILY.

By T. A. RUSSELL.

It was a strange chance which brought the Easter Lily from the southern islands of Japan to Bermuda in the Atlantic Ocean. ALFRED UNGER, in his letter to Mr. GROVE (published in the *Lily Year Book* for 1939, p. 173), places the introduction to the credit of an American Naval Officer, but local tradition ascribes it to the Church. The following account by the late Miss ANNA MARIA OUTERBRIDGE, who died in 1928 at the age of 80, is taken from LOUISE HUTCHINGS' book, *Bermuda's Oldest Inhabitants*.

"Mr. ROBERTS, the Rector of Smith's and Hamilton Parishes, between 1853 and 1857, had a college friend who had gone to Japan as a missionary. There he collected seeds and plants of every description. On his voyage back to England, the ship got into distress, and came into St. Georges Harbour. Mr. ROBERTS went to see his friend, who gave him slips of Althea, loquat seeds, and Easter Lily bulbs. These the Rector planted at Radnor, Hamilton Parish, where he then lived. They flourished well and were distributed from there. Mr. THEIS, postmaster in St. Georges, also got some bulbs from the same missionary, and planted them in St. Georges. They increased so rapidly that he was able to supply many of his friends, among whom was the proprietor of the Hamilton Hotel, and the story goes on to say that among the first bulbs to be planted in this part of the island were those in the gardens of that Hotel."

This account seems to bear the hallmark of genuineness. Certainly a happier introduction could hardly have been made. Almost every other species of Lily would have been dismayed at the new habitat with its shallow limestone soil which turns painfully dry in times of drought. Many other Lilies which have been tried since that day have failed. But this Lily took gladly to its new home and, as the account shows, these worthy gardeners, the rector and the postmaster, saw that their friends had a few bulbs as soon as they could be spared, and so the Lily spread.

Some years later it was realised that this bulb which could be grown so readily might have a sale abroad and samples were sent to the United States and Great Britain. Cultivation on a field scale was started and in 1876 a nurseryman of Philadelphia, W. K. HARRIS, launched Bermuda-grown bulbs on the American market under the name of '*Lilium Harrisii*,' by which name they are still most widely known. In 1896 nearly 14,000 boxes, or from two million to three million bulbs were exported. The subsequent decline and revival of the industry have been described by OGILVIE and others. So thoroughly has this Lily made itself at home in Bermuda that it is to be found growing and flowering amongst grass and bushes on the site

of fields where the cultivation of Lilies was abandoned twenty years or more ago.

The date of arrival of the Lily must have been nearer 1853 than 1857, for a beautiful coloured drawing of the Lily, headed "Bermuda April 12, 1856," was made by a Dr. COGSWELL and is preserved in the Bermuda Library (Fig. 15). A note by the artist in a corner of the drawing records that a stem with twelve flowers was seen on 5th May of the same year. The title given is *Lilium Wallichianum* Schultes, with which is bracketed the synonym *L. longiflorum* Wallich. The drawing unmistakably portrays a true *longiflorum* Lily and is a typical representation of the Bermuda Lily of the present day, *Lilium longiflorum* var. *eximium* (Courtois) Baker.

WOODCOCK and COUTTS describe several named variants of *L. longiflorum* and the number is increasing as a result of hybridisation within the species. The variants differ in such characters as size and form of flowers, earliness of blooming, stem-colour, hardiness, and tolerance of bulbs to cold storage. The Bermuda variety excels in the size and grace of its white flowers. An American scientist, BRIERLEY, who has recently described in the *Journal of Agricultural Research* some experiments on the forcing of Easter Lily varieties, found that of several varieties used in his work the variety *eximium* had the largest flowers, the size being measured as the product of length and diameter. The gracefulness of the flower is due both to its fine shape and to a certain delicacy of texture. This indeed is a fault of the Lily from the commercial point of view, since the blooms are on the whole too fragile for the florist to handle successfully. The variety mainly used by the cut-flower trade, the Japanese 'giganteum,' *L. longiflorum* var. *takesima*, has stiffer flowers.

The variety *eximium* is not really hardy enough to be grown successfully out of doors in Great Britain. The splendid beds of Bermuda lilies which were displayed annually by Mr. HAY in Hyde Park, London, were obtained by starting the bulbs under cover during the winter and bedding out when risk of severe frost was over. Mr. GROVE records that a variety *L. longiflorum* var. *insulare*, sent to him from Japan by UNGER, proved hardy in Berkshire, and a note in *The Gardeners' Chronicle* on a *longiflorum* from St. Helena referred to its hardiness in England so that there appears to be divergence in this character within the species. The Bermuda Lily is early-flowering and responds readily to forcing by heat in the glasshouse, and recently a new hybrid has been placed on the market which is even earlier than the standard and which differs in other characters.

This new variety was raised from seed by a veteran grower of Lilies, Mr. HOWARD E. D. SMITH, of St. David's Island, Bermuda. It is exceptional for the Bermuda Lily to set seed naturally, and accordingly, when he noticed a few pods in a field of Lilies on one occasion, Mr. SMITH saved them and grew a batch of seedlings. From them he picked out one seedling which flowered under Bermudan conditions some weeks earlier than the parent and which also possessed flowers of



FIG. 14 - AN EASTER SCENE IN BERMUDA
A field of the Bermuda Lily in blossom
(See p. 53.)



FIG. 15. LILI. BERKUDA LILI (N. 1856)
Reproduced from a painting by Dr. Cogswell
(see p. 54.)



Photo N. K. Gould.]

FIG. 16.—ERANTHUS \times TUBERGENII (*E. hyemalis* \times *E. ciliatus*)
AT WISLEY

(See p. 43.)



Photo N. K. Gould.]

FIG. 17.—SCILLA TUBERGENIANA AT WISLEY.

(See p. 43.)



FIG. 18 - *PYRACANTHA ROGERSIANA*.
(See p. 60.)

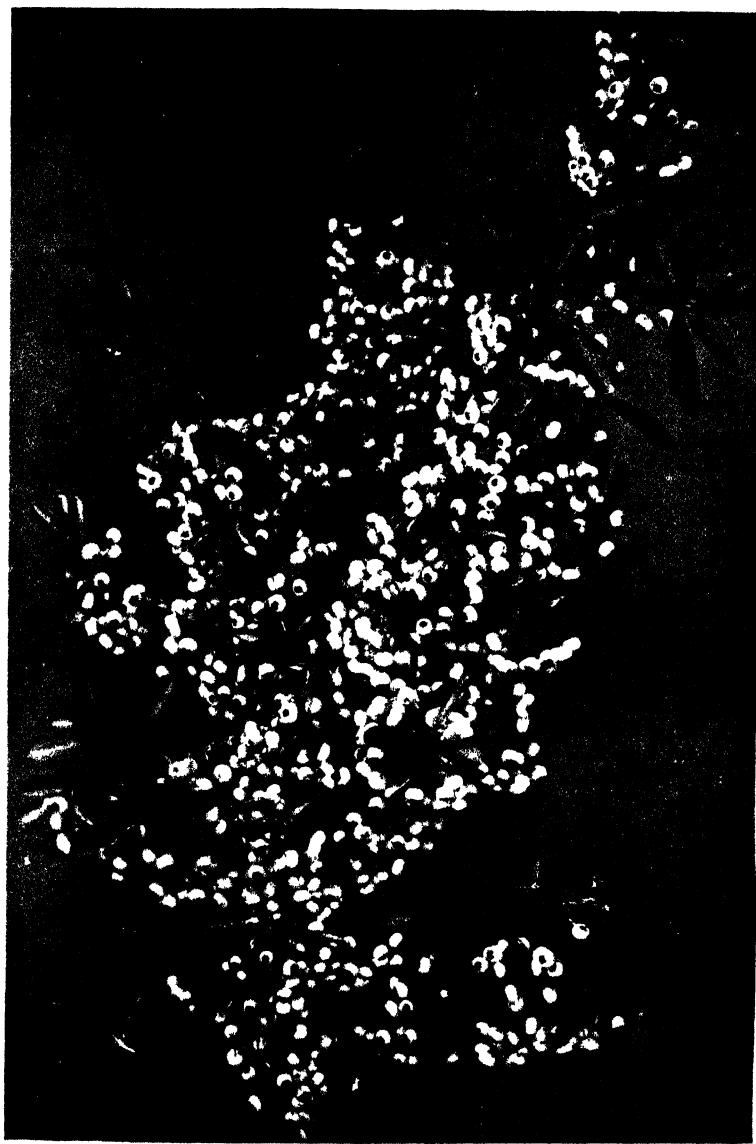


FIG. 19 - PYRACANTHA ROGERSIANA FORMA AURANTIACA
(See p. 60.)



FIG. 20.—BITEROT GIRTH SUGAR BEET (*Lettomyces tumida*)
 Raised knob-like scabs singly or in groups on the surface
 of the root
 See p. 62.



FIG. 21.—BITEROT LEAF SPOT (*Circospora beticola*)
 Small irregular whitish spots
 See p. 63.

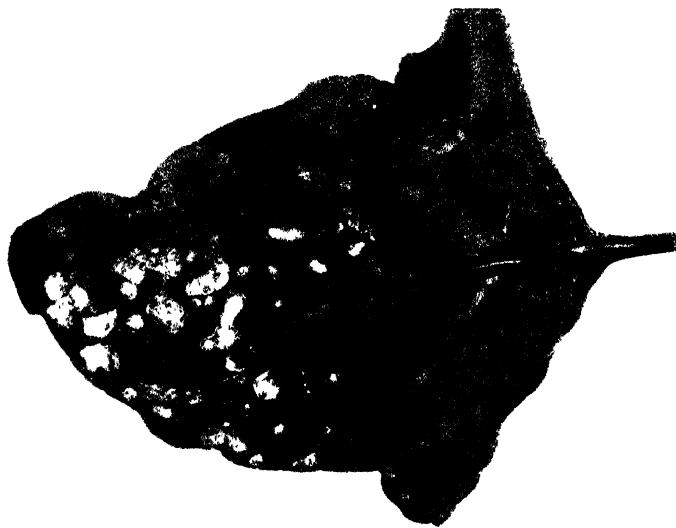


FIG. 22. SPINACH DOWNY MILDEW (*Pseudoperonospora affinis*).
Seen from above. The lower surface shows greyish
mealy patches.
(See p. 67.)

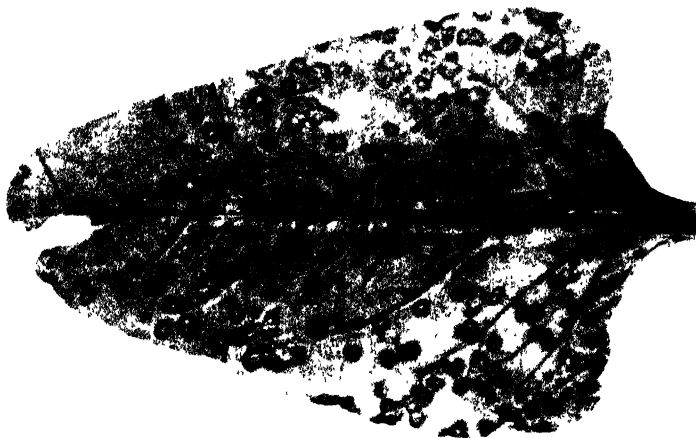


FIG. 23. SPINACH BELL LEAF SPOT (*Cercospora beticola*).
Brownish or greyish roughly circular spots.
(See p. 66.)

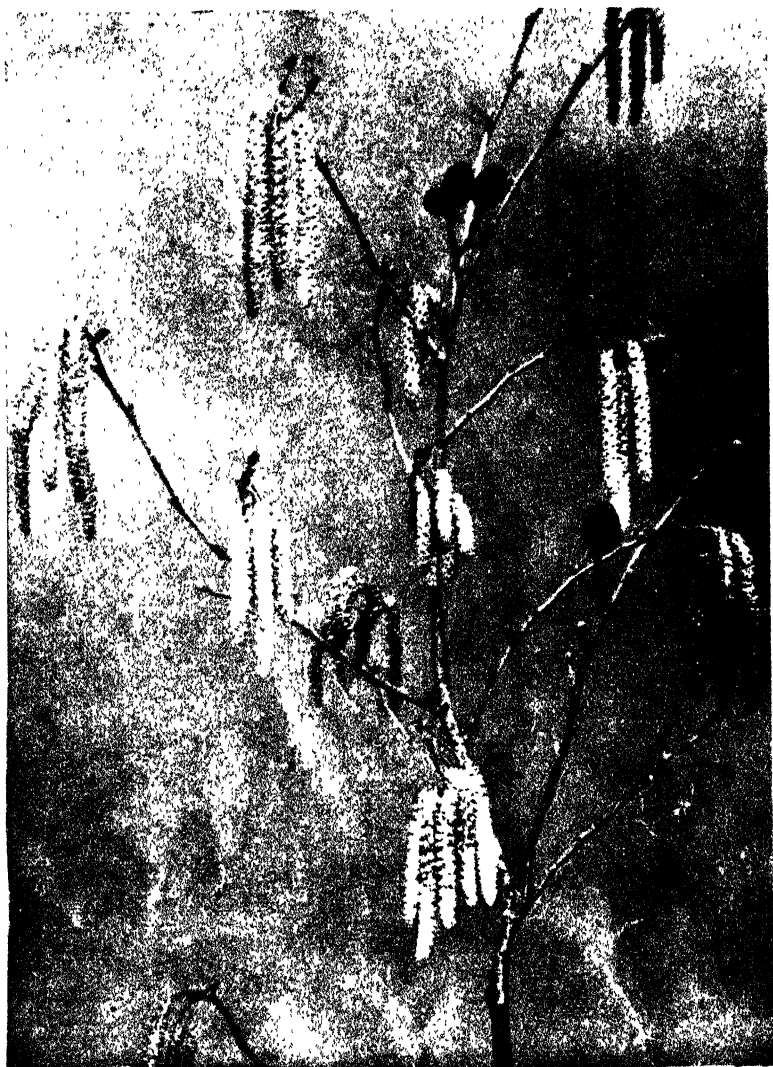


Photo - N. K. Gould.]

FIG. 24 - *AINUS CORDATA* IN FLOWER
(See p. 55.)

firmer texture though smaller in size. After some years of propagation the new hybrid was placed on the market in the United States in 1939 under the trade-name of 'Lilium Howardii.' In 1940 more than one-quarter of the bulbs exported from Bermuda were of this type.

The success won by this chance seedling shows what possibilities there are for improvement of the *longiflorum* Lily, and, as work along these lines is being done both in the United States and in Bermuda, there seems reason to hope that in course of time a range of new types of *L. longiflorum* will be available.

ALNUS CORDATA Desf. (1815).

(*A. cordifolia* Ten.).

By B. O. MULLIGAN, N.D.H.

ALDERS are not usually considered as worthy of inclusion amongst ornamental flowering trees, but the species with which this note is concerned is an exception to most of its race. The male catkins, each 3 to 4 inches long, appear in groups of four or five at the ends of the leafless shoots in March, before the Almonds begin to flower, and, as the photograph shows, or a mature tree illustrates even better, attract attention even at a considerable distance. The small, cylindrical female flowers, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, have red styles, and are produced at the base of the male inflorescence. Later they develop into hard inch-long, ovate cones on stout stalks and may remain until the subsequent year. (See Fig. 24.)

The tree in Howard's Field, Wisley, probably planted about eleven years ago and now 25 to 30 feet in height, is growing in a position sheltered from the east by adjacent Elm trees which with their matted roots must make the naturally poor soil extremely dry in the summer months. Nevertheless it seems to thrive under such hard conditions, although it would no doubt be considerably taller if planted on the river bank. At Kew there is a specimen over 70 feet high on the side of the pond facing Museum No. 1, and in *The Trees of Great Britain and Ireland* Dr. A. HENRY mentioned a number of examples in various parts of the British Isles which have attained 60 feet or more. He also quotes statements that it does well in France on dry as well as chalky soils.

This Alder is only found wild in Italy south of Naples, and on the islands of Ischia and Corsica, but despite a southern habitat is perfectly hardy in Britain and the north of France. It was introduced to cultivation here in 1820, and has been illustrated in Loddiges' *Botanical Cabinet*, t. 1231 (1827), Loudon's *Arboretum and Fruticetum*, t. lxiv D. (1838), and in the *Botanical Magazine*, t. 8658 (1916).

The specific name is derived from the large, glossy, heart-shaped leaves somewhat like those of a Pear or some species of Lime, from which it has also acquired the horticultural synonyms of *A. pyrifolia* and *A. tiliacea*.

PEAS FOR DRYING.

By Dr. J. C. WALLACE.

(The Agricultural Institute and Experimental Station, Kirton.)

"PEAS for drying" or "dried peas" may be described as seed Peas of certain varieties which are suitable for table use when cooked. The dried seed of any garden Pea can be cooked, but only a few varieties are palatable when so treated. The dried Pea is a very valuable human food, being rich in protein. It can be easily stored, and not only is it useful in winter when vegetables may be scarce, but large quantities could be kept in reserve against an emergency. They are known in the trade as Blue Peas, Marrowfats and Packet Peas. The name Marrowfat is apt to be confusing, as wrinkled varieties of garden Peas are often so described. Although often sold in packets or cartons, dried Peas are also frequently sold loose by weight.

In pre-war days, dried Peas were consumed chiefly by the industrial classes in the Midlands and the North. The demand to-day is perhaps more widespread, but the supply is less plentiful, because, in addition to the home production, very large quantities were imported. They came chiefly from the Netherlands, Japan and the Dominions, the total value being about £1,000,000. Some portion of this amount would be for Peas for other purposes, such as seed of garden Peas and Peas for stock feeding.

Before the outbreak of war, dried Pea growing in this country was confined almost entirely to the eastern part of England, but steps have since been taken to encourage their production in other areas. Once the plants are well established, dry conditions for flowering and especially for harvesting are desirable, and these conditions are usual in the eastern counties. They may, however, be grown satisfactorily in gardens in most parts of the country, because adverse conditions can be overcome more easily than in the field.

Varieties.—There are two main types of dried Peas, the Small Blue and the Large Blue. Small Blues are also known as Prussian, Louth or Lincoln Blues. The Lincoln Blue should not be confused with the Lincoln Pea. The latter is a large garden Pea in demand for canning purposes as well as for the green Pea market. The Large Blue is also known as Marrowfat, but is more frequently referred to by its varietal name 'Harrison's Glory.' 'Koopman's Glory' is a continental selection of 'Harrison's Glory.'

The Small Blue has a small round blue seed, and the plant grows from 2 feet 6 inches to 3 feet 6 inches high, according to local conditions. It is of better quality than the Large Blue, but produces less weight of crop. It has been in demand of recent years for processing, that is, canning from the dry state. Processed canned Peas are sometimes confused with canned fresh peas, to the detriment of the latter. Processed Peas must be marked as such on the label on the can.

The Large Blue produces a large Pea of a round, bluey-grey colour, slightly pitted when dry.

There are two selections of 'Harrison's Glory,' one growing about 15 inches high, and the other about 22-24 inches.

Cultivation of the Dried Pea.—In gardens the cultivation is similar to that of the garden Pea. It will do best on land well manured for the previous crop, but where the land is light or the climate very dry, well rotted manure may be dug into the soil. Plenty of moisture is desirable up to the time of flowering, after which dry conditions are required.

Preparing the Land.—The land should be deeply cultivated, preferably by double-digging. This should be done before the winter, and the soil should be left rough to permit the rains to run through. It will then dry out more easily in the spring, and thereby permit of earlier sowing.

To prepare for sowing, the land should be lightly broken up with a fork, but care must be taken not to bring up wet soil from below. Reasonable consolidation should be secured by treading, after which a tilth can be obtained by raking. A very fine tilth is not essential.

When and How to Sow.—The dried Pea requires a fairly long season of growth, and therefore early sowing is desirable. Fortunately it is hardy, and can be sown in February, if the soil is dry enough. It may, however, be sown in March and early April, and a good crop obtained. Indeed a late April sowing often does quite well. There is, however, no need to make a series of sowings as with garden Peas. Seed sown in February and March may be dusted with an organic mercurial compound as a precaution against "Pre-emergence damping off," a common cause of the seed rotting in the ground.

The seed should be sown in drills taken out with the flat of the hoe, that is with the full width of the hoe, and not with the point thereof. The drill should not be more than $2\frac{1}{2}$ inches deep, and the seed rate similar to that for garden Peas, *i.e.* 1 pint to 80-150 feet of row. The spacing between the rows should be in proportion to the height of the Peas, *i.e.* about 2 feet 6 inches to 3 feet for Small Blues, and 20 inches to 24 inches for Large Blues. Or a wider spacing may be used, and the land between the rows intercropped with other vegetables.

As soon as the young plants are through the soil, the usual hoeing should be given, followed by subsequent hoeings at intervals as required.

Staking.—In the field, Peas are not staked, but in a garden this would be a great advantage, as stakes will not only save land, but allow the Peas to ripen more uniformly. The stakes should be suitable to the height of the plants and they may be put in when the plants are 6 to 8 inches high. Prior to staking, a little soil may be drawn up round the plants with a garden hoe.

Harvesting.—This is the most difficult operation in the field cultivation of the dried Pea, and equally careful attention must be given to it in the garden, as careless harvesting will result in many discoloured Peas.

In the field, the haulm is cut close to the ground as soon as the

majority of the pods are well filled, and just as the bottom pods begin to show signs of yellowing. Late cutting induces splitting of the lower pods and the loss of many Peas.

As Peas ripen best when the pods are left on the haulm, a similar method should be adopted in the garden. As soon as the lower pods begin to turn yellow, the haulm may be cut off close to the ground or it may be pulled up. The haulm may then be left loose on the ground to winnow, but a better method would be to place it on tripods or on a simple structure made from the stakes previously used for the Peas.

If left on the ground, the haulm will have to be frequently turned over, but that should be done when it is not wet from rain or moist from dew.

There is no need to purchase tripods, as in most gardens Pea sticks 4 or 5 feet long are available. Four of these could be inserted lightly into the ground at the corners of a 3-foot square, sloping inwards and tied together at the top with a piece of string. Cross pieces should be tied on to these, about 1 foot 6 inches from the ground.

The haulm should be left on the structure until it is quite dry, which will require about a fortnight. The Peas may be separated from the haulm as soon as ready, or the haulm may be collected and stored loosely in a dry open shed, until a later date. Either of these operations should be carried out on a dry warm day.

To separate the Peas the pods may be pulled off the haulm by hand, but a quicker method is to place the haulm on a large canvas sheet or on clean sacking and beat it with a heavy stick. This will burst open the pods, and the Peas will fall out on to the sheet. The haulm should then be shaken up with a garden fork, and removed. There will be some rubbish mixed with the Peas, but this can be removed by sifting and fanning with a piece of cardboard. The Peas should then be stored in a dry place and used as required.

Dried Peas should be soaked for at least 12 hours before being cooked, and it is usual to add a pinch of bicarbonate of soda, and a little sugar to the water in which they are boiled. They should not be boiled rapidly, but allowed to simmer slowly for 20–25 minutes.

Dark Seeds.—These are occasionally found in dried Peas, and are so-called because they turn a blackish colour when cooked. They are produced from purple-flowered plants, which occasionally appear in the stock. Such plants should be removed as soon as they are recognised.

Usually it is necessary to hand-pick dried Peas, to remove discoloured seeds, which if not removed would detract from the appearance of the Peas on the table. At the same time "dark seeds" should also be removed. These are easily distinguishable, at least in 'Harrison's Glory,' as they are slightly smaller than the type, are round and smooth and are darker in colour.

Diseases and Pests.—Dried Peas are subject to the same diseases and pests as garden Peas, and the usual preventive and control measures should be taken.

THE AWARD OF GARDEN MERIT.—LXII.

284. *SALVIA ULIGINOSA*.

* *Award of Garden Merit, April 15, 1940.*

Over one hundred years ago GEORGE BENTHAM described nearly 270 species of *Salvia* in his detailed work on the family of Labiatae, and many more have been added since that date. Yet out of this large number only two have so far received this Award—the hybrid *S. superba* and the plant with which we are now dealing. As our gardens contain so many others of recognised worth both for summer and autumn flowering—we need only mention *S. fulgens*, *S. patens*, the annual *S. Horminum*, the shrubby *S. Grahamii* and *S. neurepia*, blue, perennial *S. haematodes* (or *S. pratensis*), and *S. Sclarea* as examples—it is highly probable that in future several others will be added to this exceedingly brief honours list from a genus containing so much decorative plant material.

S. uliginosa is one of the later flowering perennial species, at its best during the month of September, when it may be used in the herbaceous border in association with *Rudbeckia laciniata*, *Solidago* species, *Heleniums* of all kinds, or the tall *Eupatorium purpureum*. Owing to the height and slenderness of its stems it is as well to lend it some protection in the form of closely adjacent groups of slightly lower plants, over which may wave the five or six feet tall, branching stems with their terminating spikes of bright Gentian-blue flowers marked by a pair of narrow white streaks. This rich blue colouring is almost unique in the autumn border, and although the individual flowers are small, only half an inch across the three-lobed lip, they are borne in sufficient quantity over a long period fully to justify the use of the plant.

The rectangular stems are furrowed, and in these furrows are to be found (with the aid of a lens) rows of reddish glands which together with those covering the lower sides of the leaves, the calyx and flower buds, probably give to the plant its characteristic odour. The lanceolate leaves are opposite, on winged petioles $\frac{3}{4}$ to $1\frac{1}{2}$ inches in length, mostly 2 to 4 inches long and from $\frac{1}{2}$ to 1 inch wide, acute at the apex, tapering to the base, sharply and coarsely toothed. The flower-spikes, standing well above the thin foliage, consist of many whorls of flowers set closely together, the primary spike of each stem usually about 6 inches in length; the smaller lateral spikes follow in succession so long as the autumnal weather permits. Contrary to what is found in many of our cultivated *Salvias* the upper lip is much less conspicuous than the lower, being notably shorter, almost straight, and covered like the tube of the flower with short white hairs.

From the *Botanical Magazine*, where there is an illustration (t. 8544) which hardly does full justice to the colour of the flowers, we learn that

S. uliginosa was introduced to Kew from France in 1912, by M. P. L. DE VILMORIN. It is native to marshy places in eastern and south-eastern Brazil, whence the specific name, but despite this rather questionable habitat from the aspect of hardiness it passed unharmed through the severe winter of 1939-40 at Wisley, a testing which settled any doubts about its stamina. So long ago as 1913, it received an Award of Merit when exhibited by Mr. A. TURNER of Slough, showing that its special qualities were soon recognised.

Whilst moisture in the soil may be desirable it does not seem to be essential, and the plant will thrive in a border under conditions which suit those neighbours already mentioned.

B. O. M.

285. PYRACANTHA ROGERSIANA.

Award of Garden Merit, April 19, 1937.

The *Pyracanthas* are useful shrubs on account of the freedom with which they produce their red or yellow berries, and one of the most attractive species is *Pyracantha Rogersiana*, of which there are two forms, *aurantiaca* and *flava*, both of which have received First Class Certificates; the further distinction of the Award of Garden Merit has also been given to the species, signifying that it is a desirable plant for general use.

Pyracantha Rogersiana was introduced by FORREST in 1911 from Yunnan where it had been discovered by DELAVAY twenty years earlier; it is named in honour of Mr. COLTMAN-ROGERS, of Stanage Park, who first showed it at Vincent Square in 1913. It forms an evergreen erect bush up to 10 feet in height; the leaves are small and slender, and in June the branches are decorated with corymbs of white flowers, each flower about $\frac{1}{2}$ inch across; fruit is set freely and the resulting roundish, long-stalked berries may be yellow, orange or red; they are fully ripe by October when the shrub is a beautiful sight. (See figs. 18 and 19.)

TURNIPS AT WISLEY, 1941.

TWENTY-ONE stocks of Turnips were grown in the Trials at Wisley, of these eight were control varieties, of which good commercial stocks were obtained for comparison.

The site occupied by the trial had been previously cropped with early Cauliflowers, for which crop well rotted cow-manure was dug in in the early spring at the rate of 12 tons to the acre, and a dressing of lime applied, 16 cwt. per acre. After this crop had matured no further treatment was given. The trial was sown in rows $1\frac{1}{2}$ feet apart on July 21, 1941, the resulting seedlings being thinned to 9 inches apart in the rows. All made good growth but most made rather more

foliage than normal, due to the heavy rainfall of August = 5.47 inches. The total rainfall from the date of sowing to end of September = 7.43 inches.

ROOTS FLAT-ROUND, WHITE HEADED.

WHITE.

EARLY WHITE FLAT[DUTCH (Ferry-Morse), EARLY WHITE MILAN (control).

REDDISH-PURPLE TOP, WHITE BASE.

EARLY PURPLE TOP STRAP-LEAVED (Ferry-Morse), EARLY RED MILAN (control).

ROOTS ROUND, WHITE FLESHED.

WHITE.

Snowball, 1939 selection (sent by Messrs. Cooper, Taber and Co., 90 Southwark Street, London, S.E.), **H.C.** October 2, 1941.—Roots $3\frac{1}{2}$ to 4 inches diameter, regular. A good even stock.

EARLY SIX WEEKS (control), EARLY SNOWBALL (control), MODEL WHITE SELECTED (Dobbie), SNOWBALL IMPROVED (Bunting), CUTHBERTS EARLY EGG IMPROVED (Hort. & Bot. Assn.).

GREEN TOP, WHITE BASE.

GREENTOP SIX WEEKS (control), GREENTOP WHITE (control), MANCHESTER MARKET (Cooper, Taber), MARBLE GREENTOP (Bunting).

REDDISH-PURPLE TOP, WHITE BASE.

Early Redtop Globe (introduced and sent by Messrs. Cooper, Taber and Co., 90 Southwark Street, London, S.E.), **A.M.** October 2, 1941.—Roots $3\frac{1}{2}$ to 4 inches diameter, regular. A good even stock.

PURPLE TOP WHITE GLOBE (Ferry-Morse), RED GLOBE (control), VEITCH'S RED GLOBE RESELECTED (Watkins and Simpson).

ROOTS ROUND, YELLOW FLESHED.

Golden Ball reselected (sent by Messrs. Watkins and Simpson, Ltd., Drury Lane, Covent Garden, London, W.C.), **A.M.** October 2, 1941.—Roots 3 to $3\frac{1}{2}$ inches diameter, regular and uniform in size. A very good and even stock.

GOLDEN BALL (control), GOLDEN BALL SELECTED (Dobbie).

HYGIENE IN THE WAR-TIME VEGETABLE GARDEN.—XII.

By D. E. GREEN, M.Sc., Mycologist, Wisley.

BEETROOT.

SCAB.

THIS disease is placed first under Beetroot because it is the same as that just described under Radish (R.H.S. JOURNAL, January 1942). It is caused by *Actinomyces scabies*, or its near relation, *Actinomyces tumuli*, but the effect is much the same. Very often the scabs are no more than slight external blemishes, but sometimes they are very numerous and show as (a) sunken scabby pits, or (b) very obvious raised knob-like scabs or patches of scabs at approximately the same level on the roots, so that the name Girth Scab has been used for this appearance (Fig. 20). The sunken scabs are attributed to *A. scabies* and the raised ones to *A. tumuli*. Despite the unsightly appearance of severely affected roots it must be said that they are quite good for eating. The soil conditions which encourage this disfigurement are the same as those which have been mentioned as likely to induce the same trouble in Potatoes (R.H.S. JOURNAL, January 1941, p. 30), and on Radish, and the precautions necessary have already been discussed under those headings.

CROWN GALL.

The name Crown Gall will be familiar to many readers. This kind of gall is caused by the organism *Bacterium tumefaciens*, and the rough or smooth rounded galls appear on the roots of many different kinds of fruit trees and shrubs. On vegetables they are uncommon but are occasionally seen on Beetroot. They show as rather large warty outgrowths on the side of the root, and so can easily be distinguished from the much smaller raised places caused by Scab disease. Crown Gall on Beet is not common and is not of any importance in gardens, but any affected root ought to be burnt.

BLACKLEG AND DAMPING OFF.

Beet seedlings may suffer from damping off diseases caused by such fungi as *Pythium* sp. and *Corticium* (*Rhizoctonia*) *solani*, which have been described and discussed already on other plants (see Lettuce, R.H.S. JOURNAL, July 1941, p. 251, and Carrot, R.H.S. JOURNAL, November 1941, p. 417). In addition, the fungus *Phoma Betae* may attack Beet seedlings and this is often seed-carried. With Beet seedlings there is a shrinking and blackening of the stems below the seed leaves so that the term "blackleg" is sometimes used in describing the trouble. For field crops, methods of treating the seed with fungicides have given good results, but in gardens this is hardly necessary, and with good soil conditions there should always be enough healthy seedlings

to make a good stand. Proper liming and good tilth in the seed bed are undoubtedly well worth while as an assurance that the young plants will have every chance to develop vigorously and keep healthy.

BLACKLEG AND STRINGY ROOT.

The term "blackleg" is used very loosely to cover many troubles in plants and cannot be taken to refer to any particular disease. In the case of Beetroot, for instance, it has just been used to describe damping off due to certain fungus parasites, but it is also used for describing a blackening of the stem not caused by any parasite, but resulting from unsuitable soil conditions. Acid soil is probably the most common condition encouraging this blackleg condition in Beetroot seedlings. This does not mean that an attack will appear on a slightly acid soil, but that where the trouble is severe it is probable extremely acid conditions exist. Similarly in Stringy Root the tap root and smaller side roots become thin, tough and stringy, and acid soil is considered to be the most likely cause.

BLINDNESS.

The condition of blindness where the growing point is lost and the growth of the plant ceases can occur in many kinds of flowering plants and vegetables. It is generally considered to be due to a severe check of some kind, but the exact reason is often difficult to explain. In Beet such a condition results in no heart leaves, and it is thought that frost or cold winds may injure the seedlings to the extent that blindness is caused.

DOWNY MILDEW.

This disease due to the fungus *Peronospora Schachtii* causes the younger leaves to turn yellowish-green in places and become puckered, thickened and curled. On the lower surface of infected leaves below the light patches will be found the buff-grey mealy and felt-like growth which is the parasitic fungus. This is not usually a serious disease, and can be ignored except where a crop is grown for seed, in which case the affected plants ought to be removed and the rest sprayed with a suitable fungicide such as Bordeaux mixture.

LEAF SPOTS.

The fungi *Cercospora beticola* and *Ramularia beticola* may cause spotting of Beetroot foliage. The first fungus causes brown spots about $\frac{1}{4}$ inch across. These later turn ashen grey and the tissues may fall out leaving holes, this being the appearance known as "shot hole" (Fig. 21). The second named fungus causes similar spots but rather paler and larger. Although sometimes extensive spotting of the leaves may be seen, there is usually no need for any special remedial measures.

RUST.

This rust, due to the fungus *Uromyces Betae*, is fairly common, especially where Beetroot is grown for seed. All stages of the rust fungus are produced on the Beet, the most common being the yellowish-brown pustules of the summer (uredo) stage which may appear on either leaf surface about June or July. It is generally considered that this rust is only likely to thrive on the foliage of plants which have received excessive amounts of nitrogenous manures or are short of potash. In such case there may be some damage, but usually the prompt removal and destruction of the first affected leaves will be sufficient to check the rust. In Beet grown for seed, it may be a wise procedure to spray with Bordeaux mixture and to be certain of destroying the leaf and other debris after the crop.

VIOLET ROOT ROT.

This disease, due to the fungus *Helicobasidium purpureum*, is sometimes seen on garden Beet, Sugar Beet, etc. Affected plants when growing may show only a little yellowing and stunting of the leaves, but on lifting the root it is easy to see the fungus growing on the surface as a web-like or felt-like purple covering. Such roots must be destroyed by burning and should never be put in storage with healthy roots. This fungus affects many kinds of root crops and has been figured and discussed under Carrot (see R.H.S. JOURNAL, November 1941, p. 418).

VIRUS MOSAIC.

A virus disease of the mosaic type may occur on Beetroot foliage which shows first as small yellow spots or flecks on the heart leaves, followed by a light green or yellow mottling on the darker green of the leaf. This does not seem to be a serious disease, but having regard to the fact that this virus can infect Seakale Beet, Spinach Beet, Spinach, etc., any infected plants are better destroyed.

HEART ROT.

This is a trouble sometimes seen in Beetroot. It is of the same type as Brown Heart (already described for Turnips and Swedes), which means that there is no parasite present and the condition is thought to be primarily due to some functional disorder connected with the nutrition of the plant. The signs are that as early as July the leaves in the crown turn brown and die, and even the outer leaves may follow suit. With the crown becoming bare of foliage, a dry rot of the root may result, the crown becoming discoloured brown or black and starting to decay. A deficiency of boron may cause this trouble in some soils, and this can be remedied by applying borax (2 oz., mixed with dry sand or soil as a carrier, to each square rod of ground), but it may be the case that drought conditions and/or over-liming are

equally responsible, so that on light soils precautions to prevent extreme dryness at the roots are always advisable.

SUGAR BEET.

Some people grow this kind of Beet not for making syrup but for cooking and eating like Parsnip. When grown as a field crop it may suffer severely from disease, but in a good garden it usually does well. Generally speaking, it is liable to attack from any of the parasites already mentioned as affecting table Beet, but in the garden a more likely cause of trouble in Sugar Beet would be that kind of disease (functional disorder) resulting from unsuitable soil conditions. Some of these may be described briefly. Heart Rot or Crown Rot (already described under table Beet) is said to be due to a deficiency of the element boron, this condition being observed often in acid soils but also in some cases in heavily limed ones, in which case it is possible the liming for a time renders the existing boron unavailable. Another factor to consider is that drought aggravates this disease, and the question of keeping up proper supplies of organic matter, especially to light soils, still remains one of great importance.

STRANGLE AND STRINGY ROOT.

Both these terms are used to describe an unhealthy state in the young seedlings which is associated with acid soil conditions. In the first the hypocotyl (part above the roots) of the young plant becomes thin and shrivelled and remains constricted in its growth, although subsequently the parts above and below may thicken. In the second the true taproot and smaller side roots become thin, tough and string-like and in this weakened state may be invaded by many soil fungi that would not attack a healthy root. There is no doubt that Beet are rather sensitive to soil acidity.

VIRUS YELLOWS.

In field crops of Sugar Beet this virus is common, and may appear in the garden. The symptoms are that the intermediate leaves between the outer ones and the young inner ones turn yellowish-green and then yellow, and become brittle. They soon wither and die, and may be rotted by all kinds of semi-parasites. Such plants when identified ought to be destroyed.

SEAKALE BEET.

This seems to be a very healthy vegetable and should be grown more. It responds very well to such fertilizers as nitro-chalk, and yields over a long period. In heavy, wet soils the young seedlings may be affected by the usual damping-off fungi, but in the case of this vegetable there is also the damping off (or blackleg) due to the fungus *Phoma Betae* (see under Beet), which can be carried on the seed. Dark

or purple edges. Where the plants are not doing well through badly drained soil or other adverse condition the spots may increase rapidly. In both cases the spots in great numbers may ultimately cause withering and death of the foliage. Early attention to picking off affected leaves and encouraging the plants to keep growing strongly ought to be sufficient to eliminate such diseases.

VIRUS MOSAIC.

A disease of the mosaic type usually called Blight on Spinach is caused by the Cucumber Yellow Mottle Mosaic virus (see under Cucumber, R.H.S. JOURNAL, August 1941, p. 293). At first there is a yellowing of the young leaves, and later this appears in the older ones. The inner leaves begin to be puckered and wrinkled and much narrower. The margins of these leaves may also begin to roll inwards and are much distorted, while the outer ones are yellow and very limp. As the leaves die there may ultimately be only a few malformed central leaves remaining and the plant is almost dead. The disease is carried by aphides, and it is thought that much of the infection comes from Vegetable Marrow plants which have mosaic, or from certain weeds. Weeds should be kept down, and Marrows having mosaic should be eliminated. For winter Spinach it is said that infection is much reduced by postponing sowing until the second half of September.

MOSAIC.

There is another mosaic on Spinach which is thought to be caused by the virus of garden Beet Mosaic (which see). This appears as a downward arching of the young leaves with numerous very small bright yellow flecks on the leaf surface, and these flecks may be so abundant as to form large yellow areas. The plant is stunted and the leaves die back from the tips, although they are not malformed. Removal of infected plants is essential.

BOOK REVIEW.

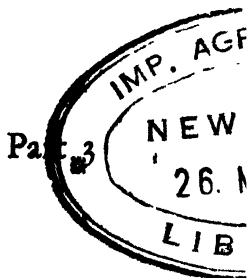
"The Rambler's Guide to Wild Flowers." By W. Percy Jones. 8vo. xxii + 246 pp. (George Routledge & Sons, Ltd., London, 1941.) 6s.

This is a very excellent little introduction to the British Flora, useful not only to the amateur who wants to be able to identify the wild plants found on country rambles, but valuable also to the young gardener as an approach to the study of systematics.

The first part of the book consists of a key by means of which a plant can be identified from the number of petals and stamens, the position of the ovary, the arrangement of the leaves and the character of the fruit. Every British plant, except perhaps some of the very rare ones or those of doubtful status, can thus be run down. Then the user of the book can turn to the second part of the book, Appendix A, where the plants are arranged in natural orders and the distinguishing features of the families and genera are set out, together with a few details about the habitat and character of growth of each species. There are a few illustrations to explain the meaning of the terms used in describing flowers and leaves and a glossary of other botanical terms. While the book does not replace Bentham and Hooker, with its illustrations, it goes easily into the pocket for use in the field and can be whole-heartedly recommended to budding naturalists.

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March 1942

THE SECRETARY'S PAGE.

CHANGES OF ADDRESS.

FELLOWS and Associates are reminded that unless a change of address is received in the first week of the month, the JOURNAL of the following month will be sent to the old address.

PROGRAMME OF SHOWS.

The monthly Show of March will be held on March 17 (12 noon to 6 P.M.) and 18 (10 A.M. to 4.30 P.M.), and the Show in April, which will include the Daffodil Show, will be held on April 14 (12 noon to 6 P.M.) and 15 (10 A.M. to 5 P.M.). The British Carnation Society will co-operate at the April Show.

DEMONSTRATIONS AT WISLEY.

Two demonstrations will be held this month at Wisley, the first in the Vegetable Garden on "Outdoor Seed Bed and Seed Sowing" from 2 to 4 P.M. on March 4 and 5, and the second in the Flower Garden on "Rose Pruning and Pruning of Shrubs" from 2 to 4 P.M. on March 11 and 12. There will also be a demonstration in April on "Spring Spraying of Fruit Trees" in the Fruit Garden from 2 to 4 P.M. on April 1 and 2.

Fellows desiring to attend these demonstrations should notify the Director of the Gardens beforehand; in case of bad weather a talk with lantern slides will be substituted, if possible.

APPLICATIONS FOR SURPLUS PLANTS AND SEEDS.

Fellows who have paid their subscriptions are reminded that the closing date for applications for surplus plants and seeds is March 9 and after that date no further applications can be received.

R.H.S. GARDENERS' DIARY.

The stock of the R.H.S. Gardeners' Diary in all its forms is now entirely exhausted.

HORTICULTURAL COLOUR CHART (VOLUME II).

The second volume of the Horticultural Colour Chart is now available. It is regretted that the price of the second volume has had to be increased to 12s. 6d. post free to Fellows, remaining at £1 2s. post free to non-Fellows. With the issue of this second volume, the Chart will be complete and it is believed will be found to fulfil the object in view, namely, that of providing a "colour guide to the garden."

SEEDS FOR PRISONERS OF WAR.

It is a great pleasure to announce that further consignments of seeds of vegetables and flowers, kindly presented by the Trade, have been sent out to the Prisoner of War Camps abroad and a number of very gratifying letters have been received from the Camps. Contributions towards the cost of this service are very welcome and those already received are gratefully acknowledged.

RED CROSS POSTAL AUCTION SALE.

It is hoped that many Fellows will support the Postal Auction Sale which the Society is holding in aid of the Duke of Gloucester's Red Cross Fund. The catalogue contains two sections; the first consists of new goods, chiefly horticultural sundries, generously presented by traders, while the other consists of second-hand books. The horticultural sundries include all kinds of garden requisites, such as raffia, twine, bamboos, knives, pruning saws, riddles, syringes, spraying machines, a sprinkler, lawn mowers, trugs, stainless steel tools, pots, manures, fertilizers, insecticides, fungicides, peat, charcoal, sand, garden furniture, cloches, greenhouses, wire and other fencing material. A sub-section for farmers and market gardeners includes a motor cultivator, tractor seats, tractor wheels, sparking plugs, oil, farm gates, silos, chip baskets, binder twine, ploughs, a motor hoe, animal medicines, disinfectants and rat poison. Under a heading "For the House" there are such things as lamps, a bottling outfit, thermometers and A.R.P. outfits. Section I ends with articles for personal or office use, such as gloves, rubber boots, riding breeches, corrugated paper and stapling machines. The largest sub-section of books naturally deals with horticulture and botany, but there are sub-sections on entomology.

fishes and angling, ornithology and general natural history. One lot consists of a valuable book graciously sent by H.M. The King from the Royal Library.

Catalogues may be had, free of charge, on application to the Secretary, Red Cross Postal Auction Sale, Royal Horticultural Society, Vincent Square, London, S.W. 1. The Organizing Committee will be particularly grateful to those who not only bid generously themselves, but also pass their catalogues on to their gardening and farming friends.

HORTICULTURAL SHOWS AND THE RED CROSS.

Last year about 350 horticultural shows were held in various parts of the country with the dual purpose of encouraging good cultivation through the friendly rivalry of the show bench and at the same time raising funds for the Red Cross. They were remarkably successful from all points of view and we understand that a sum not far short of £20,000 was produced. Some of the shows were organized by horticultural societies, but others were arranged by local committees formed specially for the purpose in localities where no horticultural society exists. Others were promoted by the welfare officers of munition factories and other industrial undertakings. It is hoped that in 1942 an even larger number of such shows may be held. Anyone who would like to assist the Red Cross in this way is invited to communicate with the Secretary, Red Cross Horticulture Committee, 34 Southampton Street, Strand, London, W.C. 2, who is in a position to make helpful suggestions on the mode of procedure and to help local committees by the provision of the requisite stationery for a show organised in aid of the Red Cross.

THE SOCIETY'S EXAMINATIONS.

The written examination of the Society's General Examination (Senior and Junior) will take place on Thursday, March 12.

The Teachers' Preliminary and Advanced Examinations will be held throughout the country on Saturday, March 21.

The written examination for the National Diploma in Horticulture will take place on Saturday, April 25.

WISLEY IN MARCH.

WITH the passing of winter, plants in all parts of the Gardens begin to show signs of renewed activity, shrubs, bulbs and alpine plants alike contributing to the ever-brightening scene. The fresh green of spring-flowering bulbs is particularly cheering, and some will already be in full flower. Of these, none can surpass *Narcissus cyclamineus*,

which revels in the moist, peaty soil of the Wild Garden, where it is steadily spreading. In the lower parts of the Rock Garden *N. maximus*, the first of the larger Daffodils, will be in full beauty by the middle of the month. *N. nanus* and the dainty white *N. Watieri* may be seen in the Alpine house, together with many other choice bulbous plants, including the fine form of *Scilla sibirica* known as *atrocoerulea*, the yellow *Fritillaria pudica* and *F. citrina*, and the pale blue *Hyacinthus azureus* and *H. orientalis*.

Scilla bifolia, together with white and pink varieties, and the *Chionodoxas*, both *C. sardensis* and the larger, usually white-eyed *C. Luciliae*, are to be found in many parts of the Gardens, and near the top of the Rock Garden there is a group of a fine bi-generic hybrid which came to Wisley as *Scilla sibirica* 'Fra Angelico.' This is a robust plant six to eight inches high with arching sprays of ten or twelve cool blue, starry flowers and broad, channelled leaves. It is very similar to, if not identical with, the plant figured in *The Gardener's Chronicle* of March 20, 1897, as *X Chionoscilla Allenii*, and described as growing at Kew among a lot of *Chionodoxas* received from Smyrna.

If the weather be kind, the various species of *Corylopsis* will now be wreathed with their scented, Primrose-yellow flowers. The Japanese *C. spicata* usually flowers first on the sunny border facing the Vinery. The equally attractive *C. pauciflora*, with smaller flowers produced on very slender, leafless branchlets, occupies a bed in the Wild Garden together with other species. Towards the end of the month the Forsythias will be conspicuous. The earliest to flower is the species grown here as *F. Giraladiana*. This was collected by FARRER in Kansu (No. 388) and formerly known (and distributed from Wisley) as *F. suspensa* var. *atrocaulis*, a mistake probably arising from its bronze- or chocolate-coloured branchlets. It forms a tall, somewhat top-heavy bush variable in size and shape of flower. One of the best forms is illustrated in the JOURNAL, vol. 66, fig. 32. The Korean *F. ovata*, next in order of flowering, is easily distinguished from other species by its lower growth and stout, rather stiff, yellow-brown twigs (Fig. 39). The nodding flowers are seen to advantage when the bushes are planted, as on the Rock Garden, in an elevated situation. The display will be continued through April by the forms of *F. suspensa* and *F. × intermedia* until brought to an end by *F. japonica*, an uncommon May-flowering species.

Many other shrubs and trees are now beginning to provide welcome patches of colour. The Japanese Quinces will be studded with innumerable buds and some expanded flowers in shades of rose, vermilion or cream; the forms of *Prunus cerasifera*, the Myrobalan Plum, covered with snowy or rose-tinted blossom; *Prunus yedoensis* and the Almonds, notably the variety *Pollardii*, generously clothed with ample pink flowers. In the Heath Garden the gaps caused by the winter of 1939-40, when so many fine specimens were killed or severely damaged, are filling up, and *Erica mediterranea* and *E.*

australis will soon be augmenting the brave show made by the varieties of *E. carnea*.

In the Vegetable Trial Ground the visitor may see a collection of varieties of autumn-sown Spinach which should indicate those best suited to this treatment. July-sown Cabbages, Savoy's and Purple Sprouting Broccoli and a dozen kinds of Cabbage sown in the autumn may also afford guidance in the choice of varieties. In co-operation with the Ministry of Agriculture and Fisheries and the Imperial College of Science and Technology a series of experiments is in progress to determine the best method of growing Onions from sets. Batches of sets of several varieties stored during the winter at different temperatures are now being planted. During their growing season they will be subjected to various manurial treatments in order to discover which will yield the most satisfactory crop.

THE WAR-TIME KITCHEN GARDEN.

Seed Sowing.—It is customary to sow vegetable seeds in rows as this facilitates the cultural operations that follow, though very quick maturing crops such as Radishes may be sown broadcast. It is a common fault to sow seeds much too thickly—a wasteful process as so many seedlings have to be discarded to ensure room for those which are left to develop. If it were certain that every seed would germinate and none be destroyed by birds, etc., it would be possible to set each seed in the position the adult plant is required to occupy, but as this is not practicable a happy mean must be struck.

Seeds will only germinate freely if the temperature is suitable and if there is sufficient, but not too much, moisture present ; it is no use expecting even germination if the seeds are sown on rough ground where they fall to different depths and are unevenly covered. The condition of the soil is of more importance than the date of sowing ; it must be well drained so that there is air between the particles, but sufficiently firm for water to pass freely upwards as the surface is dried by sun and wind, yet not so closely packed that heavy rain cannot quickly drain away. The actual digging or trenching should have been done some time earlier ; on a fine, drying day the surface must be raked down to form a fine tilth ; if necessary, the surface should be forked lightly or hoed an hour or two beforehand, after which it will be in a more suitable condition for raking. The preparation of seed drills is not a task that can be performed on a given day but must depend on the state of the soil and of the weather ; but it is better to wait for suitable conditions than to sow in soil too wet to break down properly.

The depth of sowing depends on the size of the seed, the time of year and also on the type of soil ; in light soils, which are warmer, the seeds may be put a little deeper than in heavy soils ; and later sowings, when the earth has warmed up after the winter, can be a little deeper

than earlier ones. As a rough guide, small seeds should be covered by about an inch of soil or rather less ; Peas and French Beans should be planted about two inches deep, Broad and Runner Beans two and a half to three inches deep.

Thinning and Transplanting.—However good the soil in which it is planted no plant grows well unless it has adequate root room and space to develop its leaves ; it is, therefore, necessary to thin seedlings as soon as they can be handled, say when the first true leaves are formed. If in boxes, they should be pricked out into other boxes or into individual pots ; the advantage of putting each plant in a pot by itself is that the roots will be much less damaged at the next remove either into larger pots or to the open ground ; it is impossible to get young plants out of boxes without a considerable sacrifice of the rooting system, though this method of growing young plants has to be adopted where plants are grown on a large scale, to save space and labour. Out of doors, thinning is equally important. Provided there is plenty of space between the rows, the distance apart of the plants left to mature only needs to be sufficient for unimpeded development of roots (in the case of a root crop) or to prevent undue overcrowding in the case of plants whose leaves or seeds are the edible portion. In more spacious days a considerable distance between plants was sometimes recommended, but now that all available land has to be used to the full it seems probable that no harm would be done in reducing this distance in many cases and the greater proximity may even be advantageous. But that does not mean the seedlings should be left as close as they have been sown.

Some crops, such as Carrots, Beetroots and Turnips—root crops generally—are best sown where they are to complete their growth ; others, such as the Cabbage family, are usually transplanted and are, therefore, sown in nursery beds and later removed to permanent quarters ; nursery beds should consist of well-dug fine soil, which is not too rich, to encourage sturdy growth. Onions can be sown direct, but where Onion Fly is known to be troublesome, transplanting the young seedlings may lessen the attack ; this can only be done if the plants are sown in August or reared in a greenhouse or frame early in spring ; to transplant the crop sown out of doors in spring would cut down the growing period, already none too long, so that the plants would not mature before bad autumn weather sets in.

Work to be done.—Broad Beans can be sown again, and also Peas (first earlies), Perpetual Spinach, Summer Spinach (second sowing), Leeks, Parsley, Radishes and Cabbage Lettuces. Towards the end of the month sow Brussels Sprouts in nursery beds ; and also Kohl Rabi, which is best sown in succession and used when small rather than grown to full size. Parsnips should be sown at once if this has not already been done. The first planting of Potatos may be made towards the end of the month in favourable localities ; August sown Onions and Onion sets should be planted out.

Frames.—Lettuces may still be sown for succession unless the frame

space will soon be wanted for hardening off seedlings raised in the greenhouse.

Greenhouse.—If a temperature of 55° F. can be maintained, sow maincrop Celery and Celeriac in the middle of the month.

Crops available from the garden in March.—Artichokes, Brussels Sprouts, Leeks, Savoys, Spinach Beet, Spring Greens, Turnip Tops.

From Store.—Beet, Carrots, Haricot Beans, Onions, Swedes, Turnips. Apples and Pears.

The Fruit Garden.—Newly planted Black Currants are pruned towards the end of the month by cutting every shoot on the young bushes down to one or two buds, just above ground level. This is done in order to encourage plenty of sturdy new shoots to be produced during this summer, and it is these shoots which will carry next year's crop. Blackberries and Loganberries planted during the past winter also receive their first pruning this month; each cane is cut back to about nine inches from ground level. These fruits have the same bearing habit as the Black Currant, and the first pruning aims at getting plenty of fruiting canes for next year.

Peaches and Nectarines are somewhat backward this year, and the Burgundy spray may not as yet have been applied, but do it as soon as conditions permit. When the flower buds of these fruits start to colour protect them from injury by frost by screening the trees during the night with tiffany or several thicknesses of ordinary garden netting. This protection must be afforded at night until all danger from spring frosts is over, and after a night of frost do not remove the screen in the morning until there has been a complete thaw. Protect wall-trained Apricots in the same way, as these also flower early in the season and are liable to the same damage. When Peaches, Nectarines and Apricots come into flower, ensure that the flowers are pollinated by going over the open blossoms with a camel-hair brush or a rabbit's tail tied to the end of a cane, during the middle of the day, preferably when the sun is shining.

Remove the protection which was provided for the Fig trees during the winter, and complete any tying in which remains to be done. This is a good month for planting Fig trees. Choose a warm site such as a south wall, and restrict the root run of the tree by building a brick pit two feet six inches out from the wall.

If it is intended to plant Strawberries, do so as soon as soil conditions permit. Space the average growing variety, like 'Royal Sovereign,' at 18 inches apart, allowing 2 feet between the rows. The plants in the established beds of Strawberries may have been loosened by frost, so tread around the plants when the soil is reasonably dry in order to firm the roots. At the first opportunity give the surface soil a good stir with the hoe. At the end of the month spray the Strawberry plants with lime sulphur at one in thirty to act as a deterrent against Strawberry Mite; a spreader should be added to the wash. Use as much force as possible, driving the wash into the crown of the plants.

BROOMS FOR THE ROCK GARDEN.

By FRED STOKER.

STUDENTS of Brooms * must be often exasperated by the amount of species-splitting the shrubs have undergone and, at the same time, by the tangled nomenclature which splitting has entailed. Many writers seem particularly gifted in seeing two or more species where only one exists, but whether this is owing to botanical superconscientiousness, or to some difficulty in taking a wide-angle view of two genera which are marked by the multiformity of nearly all their species, it is hard to say.

Another difficulty the student has to face is to distinguish *Cytisus* from *Genista*. The prevailing method of differentiation, as voiced by a celebrated botanist, is indicated thus: "The seeds of *Cytisus* are most generally furnished with a distinct, large, cupola-like strophiole covering the hilus and more or less enclosing the base of the seed." The value of this statement is considerably diluted by the words "most generally." The same author, speaking of the seeds of *Genista*, describes them as being "unprovided with a strophiole or furnished with a rudimentary aril." Now as both strophiole † and aril are residua of the seed-end of the funicle (the cord which attaches seed to pod) there is no essential difference between them.

Other authors, also anxious to make the point with caution, declare that the funicle is usually expanded on the hilus in *Cytisus* but that, in *Genista*, it is not so expanded as a general rule. Still others make the clear-cut assertion that the seeds of *Cytisus* are strophiolate, but those of *Genista* are not. From all this it is possible only to conclude that if a seed is free from any other structure it is that of a *Genista*, but if remains of the funicle are attached to it, the seed may be that of either a *Genista* or a *Cytisus*.

Is there, then, any positive mark of distinction between the genera? It appears not. There are, however, two more alleged differences between the species. The first is that in *Cytisus* the pistil and anthers are enclosed by the keel, but that in *Genista* they are exposed. In fact, however, in *Genista* they are very often, but not invariably, exposed. The other point of contrast is held to be that, whereas the petals of *Cytisus* are free, the claws of the wings and keel in *Genista* are attached to the staminal tube. But this generality, too, has its exceptions, rare though they may be; the lower petals of *Genista* are not always tied to the tube of stamens.

And there we are; when speaking of *Cytisus* this or *Genista* that we are, to a great extent, bowing to convention. It is comforting to

* The term Brooms is generally confined to the genera *Cytisus*, *Genista* and *Spartium*, though its application is occasionally extended. This contribution is concerned only with *Cytisus* and *Genista*.

† A wart-like eminence.

know, however, that botanical authors are in little better case, for nearly all *Cytisus* species have a *Genista* synonym. Consequently we may be permitted to wonder if both generic names justify retention or whether they might not, with advantage, be merged in one. Rouy, the French botanist, has attempted something in this line by making *Cytisus* a sub-genus of *Genista*; that, at any rate, is at least a step in the direction of simplicity.

In what follows, despite previous but gentle criticism, no departure will be made from the generally familiar nomenclature in the hope that existing confusion may be no worse confounded. In following that design, species of *Cytisus* will be first described and those of *Genista* will follow. But before these are given, a word on the scope of this article is indicated. In choosing Brooms, or any other plants, for particular positions, selection is governed by their hardiness and their suitability to the site for which they are intended. In a rock garden on the Wisley scale, a Broom of 20 feet in height would not be out of place, but, in those of ordinary size, plants not more than 2 feet high are more proportionate. This has been kept in mind in picking on the species set out below which, on reliable authority, have all survived severe winters and, as it happens, are all deciduous.

CYTISUS.

C. Ardoinii (Maritime Alps). A more or less decumbent shrub from 4 to 8 inches high with hairy, trifoliolate leaves and axillary, golden-yellow flowers held singly or in groups of as many as 6 towards the ends of the branches in April and May. A very floriferous and attractive plant.

var. *Sauzeana* has stouter stems and larger leaves.

C. decumbens (S. Europe from S. France to W. Balkans) is prostrate-decumbent and reaches a height of 3 or 4 inches by the superimposition of its branches. The leaves are sessile, simple, $\frac{1}{4}$ to $\frac{3}{8}$ inch long and hairy, especially on the lower surface and at the margin. Shining yellow flowers issue from the axils singly, in pairs or groups of 3, and open in May and June. Of the many plants which, at one time or another, have been known as *Cytisus prostratus* (and *Genista prostrata*), this appears to be that which has been most frequently described under that name. *C. decumbens* is a splendid plant in every way and, though uncommon in gardens, perhaps the best of the prostrate Brooms. (Fig. 30.)

C. demissus (S.E. Europe and N. Asia Minor (Pontus)). A prostrate shrub, 3 or 4 inches high, with hairy, ascending young shoots, trifoliolate and hairy leaves and relatively large, axillary flowers held singly or in pairs and opening in May and June. The corolla is often notched and in colour yellow, more or less blotched with reddish-brown in one or more of its parts. The calyx is hairy and more or less overlaid with reddish-brown. The Balkan plant seems a little less robust than that from the Pontus and its flowers,

if anything, a trifle smaller. A very pretty plant and evidently closely related to *C. hirsutus*. (Fig. 26.)

C. glabrescens (Central Europe). An intricately branched, rounded-mound-shaped shrub, usually not more than 18 inches high, with trifoliolate leaves, downy on the lower surface, and shining yellow, axillary flowers arranged singly, in pairs or in groups of 3 or 4, and opening in May and June. It is strange that this neat, sturdy and beautiful species is seldom met with in cultivation.

C. hirsutus (from Germany and Spain to S.E. Europe and the Caucasus). A shrub of very variable size and habit, it occasionally reaches 3 feet in height, but is usually not more than 2 feet. The young shoots and trifoliolate leaves are hairy and the yellow flowers, usually stained with reddish-brown, issue from the axils in pairs or groups of 3 or 4 and open from May to August. A good plant, nowadays rare in gardens and perhaps less suitable for our purpose than two of its varieties, namely :

var. *pumilus* (Maritime Alps and Liguria), which is not more than 12 inches high and has prostrate, ascending or erect branches, less hairy young shoots than the type and small, ciliate leaflets, smooth or slightly hairy on the upper surface and only slightly downy on the lower.

var. *Scopolii* (Maritime Alps, N.W. Italy and Hungary), a prostrate shrub with tortuous branches, hairy young shoots, small leaflets which are feebly downy on the upper surface and hairy on the lower. The flowers appear to be collected into terminal clusters but, actually, are in small axillary groups.

× *C. kewensis*, a hybrid between *C. Ardoinii* and *C. albus* and raised at Kew. A charming procumbent shrub with widely spreading branches which, gradually piling up, give the plant a height of some 18 inches. The leaves are downy and generally trifoliolate, and the innumerable, pale creamy-yellow flowers are borne from the axils in pairs or groups of 3 in May. A perfect plant for a high, rather isolated position in a rock garden.

C. procumbens (Central and S.E. Europe). This dense, intricately branched, very floriferous shrub, up to 2 feet in height, has simple leaves which are smooth or nearly so on the upper surface and downy on the lower. Yellow flowers project from the axils singly, in pairs or groups of 3, and open from May to July. (Fig. 28.)

C. prostratus. This, as a name, is invalid but stands as a synonym of *C. hirsutus*, *C. hirsutus* var. *Scopolii*, *C. decumbens*, *C. scoparius* var. *pendulus* and *C. supinus* var. *bisflorens*.

C. purpureus (Central and S.E. Europe), a procumbent species usually from 1½ to 2 feet in height, is smooth or nearly so in all its parts. It has flexuous branches, trifoliolate leaves composed of obovate leaflets up to 1 inch long, and light or darkish purple flowers which appear from the axils singly, in pairs or groups of 3, and open in May and June. A distinct and pleasant plant, appropriate for a sunny corner. Its vars. *albus*, *albo-carneus* and *atropurpureus* have

white, pink, and dark purple flowers respectively; var. *elongatus* is very fine and has long, thin, drooping branches and relatively dark purple flowers.

C. scoparius (W. Europe; common in Britain) is itself much too tall for any average rock garden, but its var. *pendulus*, which has the same distribution as the type, and is not usually more than 2 feet high, is quite suitable if an area of at least 9 sq. feet can be given it.

C. supinus (Central and S. Europe), seldom more than 2 feet high, has an upright or procumbent habit, hairy and sometimes rooting branches and trifoliolate leaves, sparsely downy or almost smooth on the upper surface, very hairy on the lower. The flowers are bright yellow and, for the most part, are presented in terminal heads from June to August, but blooms occasionally appear from axils on the year-old wood in spring.

var. *bisflorens* has prostrate or almost prostrate, often rooting branches, and a more pronounced twice-flowering habit; the spring flowers are borne in axillary racemes along the length of the year-old branches.

GENISTA.

G. anglica (W. Europe, common on moorland in Britain). A spiny, smooth, semi-procumbent and rather straggling shrub from 1 to 2 feet high, with simple, narrow and pointed leaves about $\frac{1}{4}$ inch long and yellow flowers from June to August in short terminal racemes. A very floriferous but not a showy plant owing to the blooms being much less lustrous than is usual in the genus. An interesting shrub from its historical associations.

var. *subinermis* is more or less prostrate and has few, sometimes very few, spines, and those are feeble.

G. aspalathoides (S.W. Europe, N.W. Africa) is a dense, spiny, almost prostrate little shrub from 4 to 12 inches high. The leaves are simple, downy, and fall early. Pale yellow flowers issue from the axils singly, in pairs or small groups, and open in June and July. A very attractive plant with a likeness to *Erinacea pungens*.

G. dalmatica (W. Balkans). A compact, tufted, spiny, very floriferous and slowly extending shrub from 4 to 6 inches high. The branches are hairy, the leaves simple, linear, pointed and downy. Bright yellow flowers in terminal racemes open in June and July. A valuable plant for a low ledge.

G. delphinensis (S. France; Depts. of Drôme and Pyrénées-Orientales). A prostrate-decumbent shrub only an inch or two in height with winged branches. The few leaves are simple, oval or ovate, pointed, downy and less than $\frac{1}{4}$ inch long. Relatively large, bright yellow flowers are held in both terminal and axillary clusters of 2, 3, or more. Like a miniature *G. sagittalis* except that the latter presents only terminal clusters of flowers. A first-class plant for our purpose. (Fig. 29.)

G. januensis (S.E. Europe), a procumbent shrub, a foot or less in height, with widely spreading branches and erect or ascending young

shoots. The stems are triangular, the leaves simple, usually fasciculate at the base of the shoots, obscurely hairy at the margins, but otherwise smooth and up to an inch long. Bright yellow flowers in long terminal racemes open in May and June. A very decorative species, but rather liable to be cut in severe winters. (Fig. 31 (for the loan of which I am indebted to Messrs. Malby).)

G. pilosa (S. Europe including S.W. England). A procumbent or sometimes prostrate shrub with erect or ascending, hairy young shoots, eventually becoming a ravelled mass of branches as much as 20 inches in height. The leaves are simple, fasciculate below, hairy on lower surface and up to $\frac{1}{2}$ inch in length. Racemes of small yellow flowers terminate the new shoots and open from May to July. A useful species for a half-shady corner.

G. sagittalis is too vigorous for the choice parts of a rock garden, but forms an excellent ground cover in more or less shady positions where its terminal clusters of yellow flowers, opening from May onwards, are not to be despised. Its winged, green stems give the shrub an evergreen appearance.

G. sericea (N.E. Adriatic lands). A rather straggly, prostrate-decumbent shrub of an eventual height of from 6 to 9 inches, with ascending, downy young shoots; the leaves are simple, narrow and silky-hairy on the edges and lower surface, and the silky, yellow flowers are arranged in sub-terminal racemes and open in May and June.

G. Villarsii (S.E. France, W. Balkans). A dense, prostrate shrub with tortuous, rooting branches which, when young, are ascending or spreading and very hairy. The leaves are simple, fasciculate at the base of the shoots, linear-lanceolate, hairy and about $\frac{1}{4}$ inch long. Silky, yellow flowers in short, leafy racemes terminate the branchlets and open in July and August. Comparatively slow-growing and less floriferous than the average Broom, but nevertheless a very attractive plant owing more than a little of its charm to the grey hairs on leaf and shoot which give it a greyish-green, or even greenish-grey appearance. (Fig. 27.)

It seems, though it cannot be asserted, that Brooms in general prefer a neutral or lime-free, though not too acid, soil. Of our native species, *G. anglica* is found in heathery areas, *C. scoparius* is common on the Bagshot Sand, and *G. pilosa* favours siliceous soil. At all events, species of *Cytisus* and *Genista* and, incidentally, *Spartium junceum*, grow extremely well in a lime-free medium and flower generously.

As Brooms are tap-rooted, it is advisable to plant them out with their pot-balls, only clearing the latter of drainage and gently freeing the surface rootlets.

Propagation is simple. Rooted offsets may be had from a number of species and potted up at once; cuttings of half-ripe wood will, in general, root fairly quickly in a cold propagating frame, but to obtain the most shapely and robust plants raising from seed is the master method.

THE FUTURE OF DWARF CONIFERS IN THE ROCK GARDEN.

By MURRAY HORNIBROOK.

HAVING regard to the importance of preserving so distinctive a feature as the Dwarf Conifer has become in our gardens, I would make an appeal for assistance in its preservation before it is too late.

Considering how precious and attractive a really dwarf Conifer can be, it is a tragedy that its place is so often occupied by semi-arborescent impostors, and the time is rapidly approaching when the repeated disillusionment of the average gardener will result in the banishment, and consequent disappearance from cultivation, of all but a few, such as *Juniperus communis compressa*, which can be depended upon, in any circumstances, not to encroach.

The responsibility for this condition rests, primarily, upon the British nurserymen who, unwilling to propagate these forms themselves, have been content to take, and recommend, whatever the Continental nurseries have sent to them, untried and, more often than not, entirely untrue to name.

Moreover, not content with merely selling, as received, the stuff imported from the Continent, I have met with very many examples of almost inconceivable stupidity on their part as regards certain forms they have recommended and sold. One, or rather two, such are the varieties *squarrosa* and *plumosa* of *C. pisifera*. I have met these frequently in the last 35 years not only sent out as suitable "dwarfs" for the rock garden but even sent out planted in tiny sink gardens! As both these varieties can be seen in the wild garden at Wisley, substantial trees of about 35 feet in height, to plant these in sinks is only demanding a very early disillusionment of the purchaser which must react unfavourably on the nurseryman.

But the responsibility must be shared by the unthinking gardening public who, desiring an immediate effect, demand "trees" of not less than 18 inches to 25 inches for which they expect to pay about 5s.

Anyone who takes the trouble to consider the matter must realize that a "tree" whose ultimate height, reached probably in 35 years, should not exceed 4 feet, must be in the neighbourhood of 17 to 20 years old to have attained the height required and could not possibly be sold for six times the price he is willing to pay. A four-year-old plant from a cutting of one of the dwarf Spruces, for instance, would probably measure about $3\frac{1}{2}$ inches \times 4 inches, but how many intending purchasers at Vincent Square on seeing such a tiny plant offered for 4s. would not hoot with derision and pass on to a neighbouring stand where they could purchase a nice fat-looking tree, six times as large, for very little more?

Since British customers have demanded such plants, the Dutch and French nurseries have supplied them by grafting on arborescent

seedlings, grown in very rich soil and the thickness of a good-sized thumb, a tiny branchlet of the selected form, preferably from leading shoots, and by such means a saleable sized tree is obtained in about 3-4 years which can be sold at the required figure, to the immediate satisfaction of both parties. But the satisfaction of the purchaser is soon turned to disillusionment as he finds his "dwarf" Spruce, planted in a select niche in his scree, rapidly assuming the proportions of a good-sized "Christmas Tree" and, before all his treasures are swamped, he hurls out the "Dwarf Conifer" in disgust.

As these forms are all abnormal it is obvious that they must not be encouraged to revert to normal; one is simply urging them to revert by grafting them, and almost insisting on it by grafting them on stems five to ten times as thick as the grafted branchlet.

It cannot, therefore, be too clearly or too often reiterated that the only real chance one has of retaining the abnormal dwarf character of these forms, is to propagate them *persistently* from cuttings, the cuttings to be taken, in the case of globose forms, from the *lowest side branchlets* and, in the case of fastigate forms, from the *leaders* of the lower side branchlets—from such cuttings the original form of the "mother" is most likely to be obtained. One should avoid propagating from upper branchlets and never in any circumstances from top leading shoots. A counsel of perfection, when taking cuttings from an imported grafted plant, is to propagate from at least two generations of plants struck as cuttings.

I will elaborate this by an example: *C. Lawsoniana* var. *Fletcheri* was originally a bun-shaped "witches-broom" found on an otherwise normal tree of the type. Propagated at first from cuttings taken indiscriminately, it formed a low shrub, rather higher than wide, ultimate height about 3 feet. But Mr. Astley, Fletcher's foreman, happening to be short of cuttings, tore off some of the lowest branchlets from some plants just being sent out and from these, in the first generation, he got plants much lower and denser than any raised before and, persevering, took lowest branchlets from these and got various bun-like forms varying from "buns" very like the original "broom" to perfect balls. I had two of these balls which retained this shape perfectly and were so slow growing that they could have been planted almost anywhere with safety. In contrast to these, from *grafts* of the lower branchlets, one has the type now generally found in cultivation—a broad shrub of from 5-8 feet, and from grafts of *upper* and *leading* shoots one finds occasionally small trees over 12 feet. I have heard of some of over 20 feet which are reverting.

Nobody who has not had a wide experience of these dwarf forms can have any idea of how absolutely fantastic the results of grafting them may be; I have seen a tuft of branchlets only 6 *millimetres* long producing reverting shoots 15 *centimetres*, or more than twenty-five times their own length, long. Again, *Cryptomeria japonica* var. *Vilmoriniana*, on its own roots at 60 years old, dense and semi-globular and just over 2 feet by 2 feet 6 inches, was shown as a five-year graft

making a very open, thin pyramid about 4 feet by as much through.

Examples like these could be multiplied *ad infinitum*, but to anyone in whom may remain a lingering doubt I would mention the "Dwarf Conifer Collection" that I presented to Glasnevin Botanic Gardens in 1922. As most of these forms were rare they had to be taken as they were and most of them were 3-4-year-old grafts purchased from Russian, German, Dutch and French nurseries; from recent photographs I can identify Spruces that normally should not exceed 4 feet, and not attain that for 30 years, as already approaching 15 feet.

With the exception of the Pines nearly all these forms can be struck from autumn cuttings in sand or sandy soil, and the future of these fascinating little trees now depends upon those who are wise enough not to plant grafted plants in their gardens, keeping them apart merely as stock plants for the supply of cuttings; I can assure them that their patience will be well repaid, and I would beg of those who have any soft spot in their gardening hearts for these little trees not only to exercise their patience in raising some plants from cuttings, in order that others may see, learn and appreciate what a really "dwarf Conifer" looks like, but that they should also lose no opportunity of reassuring the disillusioned, many of whom believe that the term "dwarf Conifer" is a misnomer and that Conifers can be kept dwarf only by starvation and clipping like a privet!

A NOTE ON THE EMBOTHRIUMS.

By COLLINGWOOD INGRAM.

THERE are two more or less distinct species, or varieties, of the Chilean Fire Bush in cultivation and also, perhaps, several intermediate forms. The two extremes are easily distinguished by their leaves, one having moderately broad, ovate-lanceolate foliage and the other much longer, linear-lanceolate leaves. The former, *Embothrium coccineum* Forster, was first introduced into this country by LOBB as long ago as 1846. This is the southern form. The latter, of more recent introduction, comes from further north in Chile. This is the one usually, though erroneously, called *E. longifolium* by horticulturists, but its correct name would seem to be *E. lanceolatum* Ruiz & Pavon. Whether these two races are sufficiently distinct to be regarded as separate species is a moot point I do not now propose to discuss. It may, however, be noted in passing that, although intermediate forms undoubtedly occur, on the whole the leaf-characters described above appear to be fairly constant, and usually well pronounced, in their respective areas of distribution. Personally I do not consider the question of deciduousness referred to by H. E. COMBER (*Gard. Chron.*, Jan. 25, 1936) of much importance, as I have found this varies with the age of the plant and also according to the severity or mildness of the winter climate.

Among horticulturists it is widely supposed that the long-leaved form is hardier than the typical *E. coccineum*. To this supposition I cannot subscribe. In my opinion it is a misconception based on the fact that during his 1927 expedition COMBER collected seeds of an *Embothrium* with this type of foliage at a relatively high elevation.

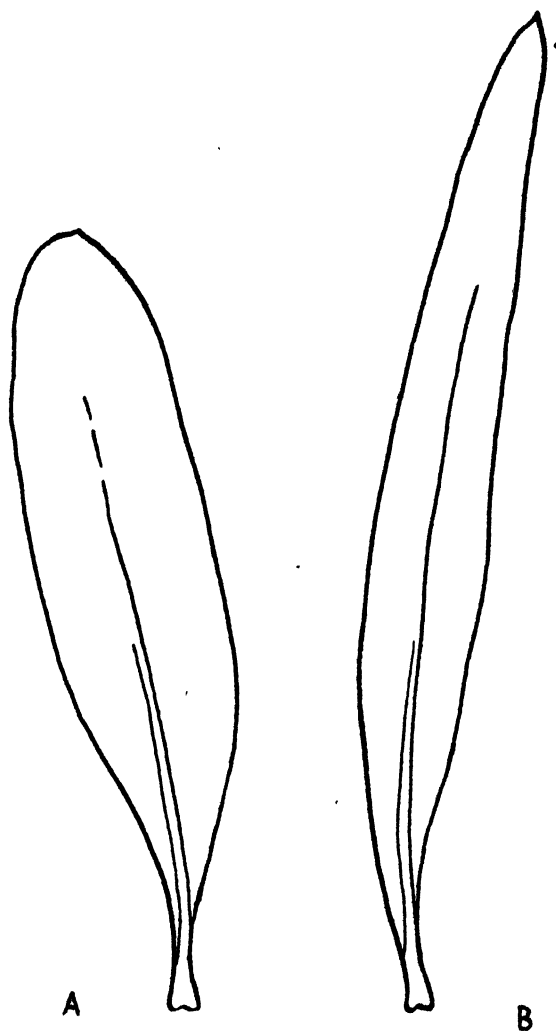


FIG. 25.—TRACINGS OF THE FOLIAGE OF (A) STRAITS OF MAGELLAN SEEDLING, *Embothrium coccineum*, (B) LLANQUIHUE SEEDLING, *E. lanceolatum*.

Plants raised from these seeds have proved fairly resistant to cold : but this does not mean that all such *Embothriums* are equally hardy. They are not. During my travels in Chile I encountered this narrow-leaved form growing right down to sea-level in the Puerto Montt district, and seeds which I gathered from the near-by shores of Lake Llanquihue have produced plants indistinguishable from those of COMBER's collecting. The resultant Llanquihue seedlings, with a

single exception, were all killed outright in the open ground last winter. I do not know from what province in Chile LOBB's original plants of *E. coccineum* came, but I can definitely state that it is the broad-leaved form that occurs in the southernmost, and therefore coldest, part of that country. Three years ago I received seeds of the Fire Bush from Magellanes (a coastal town in the Straits of Magellan), and when these came up I found that the plants were all of the broad-leaved type. According to the sender, Magellanes is near the southern limit of the species' range, but if we can believe R. O. CUNNINGHAM (cf. *Nat. Hist. of the Str. of Magellan*) it extends considerably further and reaches as far as South Fuegia. Referring to the Western Channels of Patagonia, CUNNINGHAM says that the species there "seldom exceeds the dimensions of a tall shrub and is often not more than one or two feet in height." He describes the high ground above Cape Negro as being "a perfect blaze of scarlet with the blossoms of *Embothrium coccineum*," which would seem to indicate that it is a social species in that district. I did not notice a similar habit with *lanceolatum* further north. In view of the climatic conditions prevailing in the Straits region I am hoping my Magellanes seedlings may prove hardy with me in Kent. This expectation is strengthened by the presence of an old specimen with similar foliage in Hempsted Park, which is only about a mile from my place. There is good reason to suppose that this Hempsted *Embothrium* also originated from the Straits of Magellan as it is growing in the same bed, and is apparently of the same age, as a specimen of *Nothofagus betuloides* which is essentially a tree of that district. Both were probably collected by ELWES some forty or fifty years ago. Because of its more southern habitat I think it may be safely assumed that the typical *E. coccineum* is far more likely to prove hardy than *E. lanceolatum*, unless, of course, a mountain form of the latter is chosen, as was the case with COMBER's introduction.

As we have seen, in Southern Chile *Embothriums* are mostly bush-like in growth, or at best small straggly trees. Nowhere, in my somewhat limited travels, did I encounter an example that could compare for size or beauty with the magnificent specimen growing on Valentia Island, off the south-west coast of Ireland, nor with the forty-foot tree at Kilmacurragh.

THE JOHN INNES COMPOSTS.

By W. J. C. LAWRENCE.

BRITISH gardening began in the private garden. There, new and rare plants were introduced, various methods of growing them tried out and the professional gardener's skill and knowledge developed. Sons might learn their art from their fathers, but otherwise the success and reputation of a man as a gardener would largely depend on his own observations, shrewdness and initiative. To impart his hard-won knowledge was to give away the very thing that enabled him to command a good position. Thus it came about that each man had his own way of growing plants. As the number of cultivated species increased, the number of ways became endless. The potting shed was a place of secret rites performed by an individual who was a law unto himself.

As the years passed, there grew out of private gardening three new branches of horticulture: the public botanic gardens, municipal parks and commercial nurseries. The men who staffed these offshoots were, of course, trained in private gardens, and carried with them the traditional practices and individualistic outlook of the private gardener. These they largely retained, apart from where the pressure of competitive business forced some readjustment of the gardener's notions and practices.

Thus the commercial nurseries growing large numbers of relatively few plants have been forced to rationalize plant production, in so far as it is in their power. Changing fashions in plants have encouraged the nurseryman to be adaptable, on the alert and willing to experiment. Similarly, the municipal parks, spending public money and concerned to please the ratepayer, are in the main progressive. In contrast the botanic gardens, which are sheltered from trade competition and public criticism, tend to preserve the old traditions. Having to cope with a great variety of plants, they are impressed by the different rather than the similar requirements of their charges.

In the last decade or two, an adventitious shoot has appeared in the gardening world and made prodigious growth—namely, amateur gardening. Such roots as it has were nourished in the private garden, but on the whole the amateur, though always eager to learn, is an independent creature, preferring to work out his own salvation, if someone will tell him an easy way to do it.

Here then is our cross-section of British gardening to-day: the private gardener (fast disappearing), exercising his cultural skill on a variety of plants; the commercial gardener engaged in the mass-production of a few plants; the municipal gardener combining something of each of private and commercial activities; the amateur,

with ambitious ideas and a craving for simple methods of achieving them. Diverse as their requirements are, there is one fundamental requirement that is common to all: the successful raising of seedlings and pot plants.

Now in the past the materials used in making up seed and potting mixtures were traditional: loam, leaf-mould, low-grade peat, sand, animal manure, mortar rubble and perhaps some bone meal. These were used in almost every combination, and by their aid more than a few men achieved wonderful results as cultivators of pot plants. However, to any impartial observer it should have been apparent that quite different composts frequently gave equally good results when used for the same kind of plant. But, as we have seen, professional gardeners are not impartial fellows; each prefers to back his own judgment and skill. There was little attempt to pool the results of experience and so discover the essentials of good composting. Even if this attempt had been made, it is doubtful whether a satisfactory answer would have been found. Each of the materials commonly used in composting varies a great deal in quality—*e.g.* leaf-mould according to the kind of leaves it is prepared from, manure according to the diet of the animal that produces it, the way it is stored and so on. There were so many uncontrolled variables that the whole business of composting was hopelessly confused. Failure to grow good plants might have been due to any one of a number of reasons, and no one could definitely say which.

Clearly then there was need for experiments in which standard materials were used and tested one at a time to ascertain what part they played in the compost. A fundamental question had to be answered: what are the essential characteristics of a good compost? No one had ever asked this question, so the answer had never been given.

How long this state of affairs would have lasted cannot be said. But by a fortunate accident at the John Innes Institution we were compelled to ask the question, and found the answer. One of our most important experimental glasshouses was suddenly attacked by a soil-borne infection, a wilt. Sterilizing the soil did not cure the trouble but made things much worse, and so we began an investigation to sort things out. Little by little its scope was extended, as it became clear that every aspect of composting would have to be included to get a satisfactory solution to the problem. Some of the results of these experiments were unexpected and novel; in the aggregate it seemed that they might revolutionize the growing of pot plants.

From full-scale trials made by us at Merton and by a few enterprising nurserymen and amateurs collaborating with us elsewhere, it quickly became apparent that our hopes of the new method would be justified. Though it might not be ideal for every species, yet for the great majority it would provide a simple, standardized way of growing plants. The numberless composts of the past could be reduced to

two; complexity give place to simplicity; variety of results to uniformity; uncertainty to confidence. Here was a method which should suit the requirements of private, commercial, municipal and amateur gardens alike. Gardening under glass could be rationalized.

What, then, are the distinctive qualities of the John Innes composts? First, they are of good texture, freely permitting air to penetrate the soil and allowing excess moisture to drain away. Secondly, they provide an adequate and balanced food supply throughout the life of the plant. Thirdly, they are free of all harmful organisms and substances.

Simple as these requirements may seem, it is not likely that the old methods would fulfil them often, and impossible that they would repeat them always. How important these factors are may be seen almost any day in almost any garden or nursery. Seedlings may be observed trying to grow in soil which is sticky when wet and hard and cracked when dry. Plants have lost their bottom leaves, have a stunted appearance and cry aloud their lack of plant foods. Damping off of seedlings, and the depredations of wireworm, eelworm and other pests, are as common phenomena as the plants themselves. In the good garden these "mishaps" are reduced to a minimum; in many gardens they are all too apparent. We should be a little shocked to walk into a town and find the inhabitants obviously ill-housed, starving and verminous, but in a greenhouse their equivalents in the plant world are often accepted as acts of God. Such a view is nonsense and betrays the man who does not know his job.

To come back to the John Innes composts: how is good texture, adequate and balanced food supply, and freedom from harmful organisms and substances achieved? The first by using loam (soil), peat and sand of the right kind and in the right proportions; the second by adding artificial fertilizers; and the third by partial sterilization of the loam. Let us examine these more closely.

First, the question of *texture*. The J.I. composts differ from the old ones in that highly sterile moss- or sedge-peat is used in place of leaf-mould; and the sand is much coarser. The peat has practically no nutrient value, but it has outstanding physical properties. Its spongy nature prevents the loam from compacting, and its high water-absorbing capacity ideally regulates the moisture content of the compost. The peat should be dust-free, relatively undecomposed and moderately coarse in texture. There are a number of such peats available. The sand should grade up to $\frac{1}{4}$ -inch particles or as coarse as can be got. Most horticultural sands are too fine. The best loam is moderately heavy (*i.e.* slightly greasy) and is prepared by stacking the turves from pasture, grass side downwards, for six to twelve months. It should be riddled through a $\frac{3}{8}$ -inch sieve before use. Ordinary soil from a cultivated garden can be used, though as a rule it is not so good as turfy loam.

Next in regard to *food supply*. In the course of our experiments

every loam or soil tested, however well supplied with nitrogen and potash, was found to be deficient in phosphate. This deficiency of phosphate proved to be of considerable importance for seedlings. Their growth is rarely as good as it should be, unless phosphate is added to the seed compost. When this is done the improvement obtained is often remarkable (Fig. 32). For the potting compost a mixed fertilizer is used, known as the J.I. Base. Its special value lies in the proportions of the materials used, the experimental method by which these proportions were adjusted and the fact that the proportions are not secret.

Thirdly, harmful organisms and substances are eliminated from the J.I. composts by a special method of *partial soil sterilization* employing steam as a heating agent. Sterilization by heat has a number of advantages, but for many years it gave indifferent results. Experiments showed that while heating the soil was a most effective way of eliminating all harmful organisms, it resulted at the same time in the production of excess nitrogen and possibly of other harmful substances. This soil poisoning is due to the action of heat on humus, especially if the heating is excessive or prolonged. The presence of lime increases the effect; phosphate counteracts it (Fig. 33). Once these overlapping factors had been sorted out, the new technique of soil sterilization could be laid down: use dry soil, heat it thoroughly, heat it quickly, do not overheat it; and add superphosphate. If steam is used, overheating is impossible; thoroughness and speed depend on the design of the sterilizer. The simplest way is to put half an inch of water in a saucepan, fill up with dry sifted soil and put the lid on; then bring to the boil and simmer for 15 minutes. For larger quantities the soil may be suspended in sacking over boiling water in a domestic copper for 30-40 minutes; or there are proper sterilizing appliances, steam and electric. With efficient apparatus, sterilization should not take longer than 60 minutes, whatever the quantity.

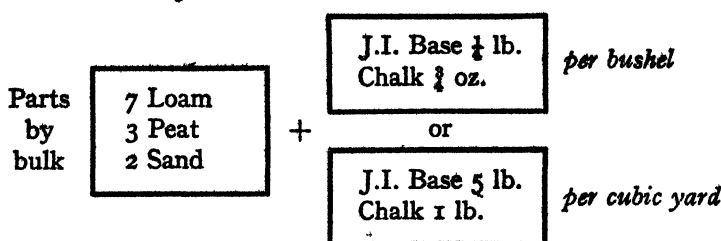
Soil may also be sterilized chemically. This entails watering the soil with a solution of the chemical agent and covering with sacking for some hours until the fumes have penetrated all the soil. The soil is ready for use when all fumes have disappeared; usually this takes two or three weeks.

The formulæ of the composts are as follows:

JOHN INNES SEED COMPOST.

Parts by bulk	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> 2 Loam 1 Peat 1 Sand </div>	+	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Super $1\frac{1}{2}$ oz. Chalk $\frac{3}{4}$ oz. </div>	<i>per bushel</i>
			<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Super 2 lb. Chalk 1 lb. </div>	
			or	
			<div style="border: 1px solid black; padding: 5px; display: inline-block;"> Super 2 lb. Chalk 1 lb. </div>	<i>per cubic yard</i>

JOHN INNES POTTING COMPOST.



Super = superphosphate of lime.

Chalk = ground chalk or limestone.

JOHN INNES BASE.

Parts by weight : 2 Hoof and horn, $\frac{1}{2}$ -inch grist (13 per cent. nitrogen).
2 Superphosphate of lime (16 per cent. phosphoric acid).
1 Sulphate of potash (48 per cent. pure potash).

Until recently, the J.I. Base could be bought freely from sundries-men, but like some other mixed fertilizers it is now in very short supply. The form of lime recommended is calcium carbonate—*e.g.* ground chalk, ground limestone, limestone flour, "Thurlim" (Woolworth), whiting, etc. Hydrated lime is not so suitable.

The preparation of the compost is simple. First the sifted loam must be sterilized, then the unsterilized peat, sand and fertilizers are added and the whole thoroughly mixed. It is not possible here to give all the particulars regarding the use of the John Innes composts—they are dealt with elsewhere.* The composts give good results with almost any plant, therefore they are economical as well as reliable. Plants as different as Begonia, Carnation, Chrysanthemum, Cucumber, Hydrangea, Rose and Tomato, not to mention stove plants, bedding plants, bulbs and alpine, all do well in the J.I. composts.

The final test of the J.I. composts, however, is not what we think of them at Merton, but in what measure they have superseded the old soil mixtures. It can be said at once that the new composts have won favour among hundreds of growers in all branches of horticulture. They are equally popular with the largest commercial grower and the smallest amateur. In this respect, however, a qualification has to be made. It takes us back to where we started. The order of popularity of the new composts is clearly related to the enterprise and initiative of the type of gardener concerned. Thus commercial growers lead the way, followed by the municipal and amateur gardeners. Private gardeners lag considerably, while botanic gardens have barely left the starting post.

* John Innes Leaflet 1/2, 1941 (from the Institution, 31 Mostyn Road, London, S.W. 19). 6d., post paid.



FIG. 26.--*CYTISUS DEMISSUS*
(See p. 78.)

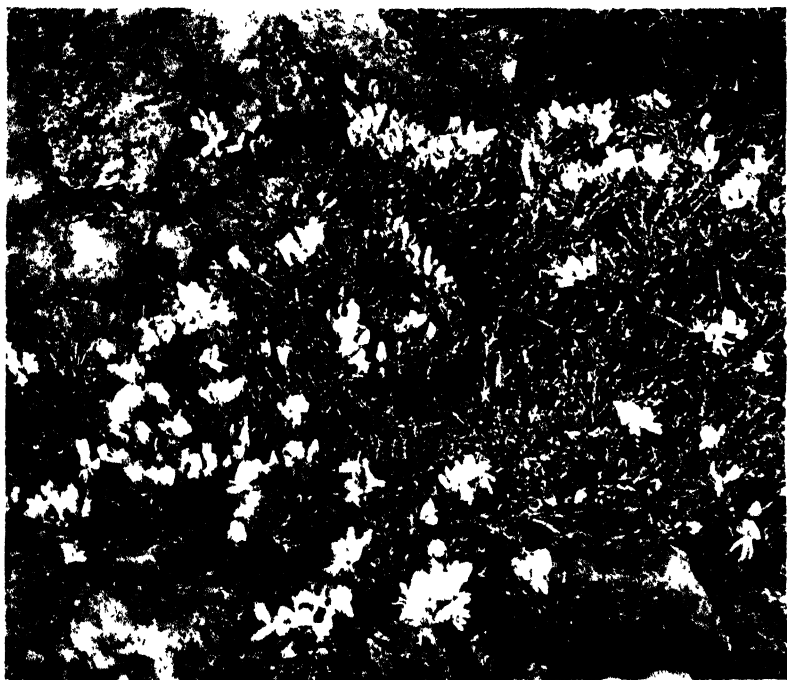


FIG. 27.--*GENISTA VILLARSII*.
(See p. 80.)



FIG. 28 - CYTISUS PROCUMBENS
(See p. 78.)



Fig. 29. *GENISTA DEUTUNENSIS*
(Sep. 29.)

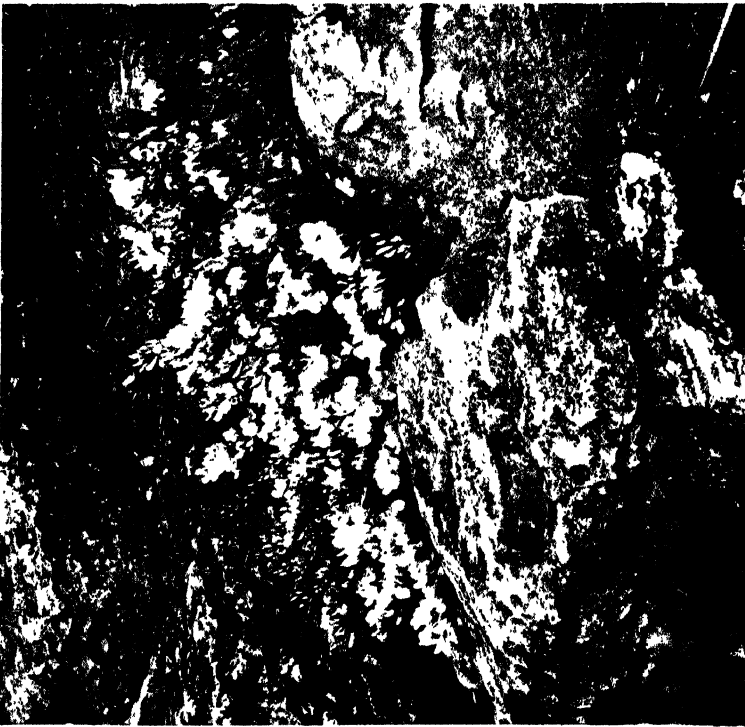


FIG. 30 —CYTISUS DECUMBENS.
(See p. 77.)

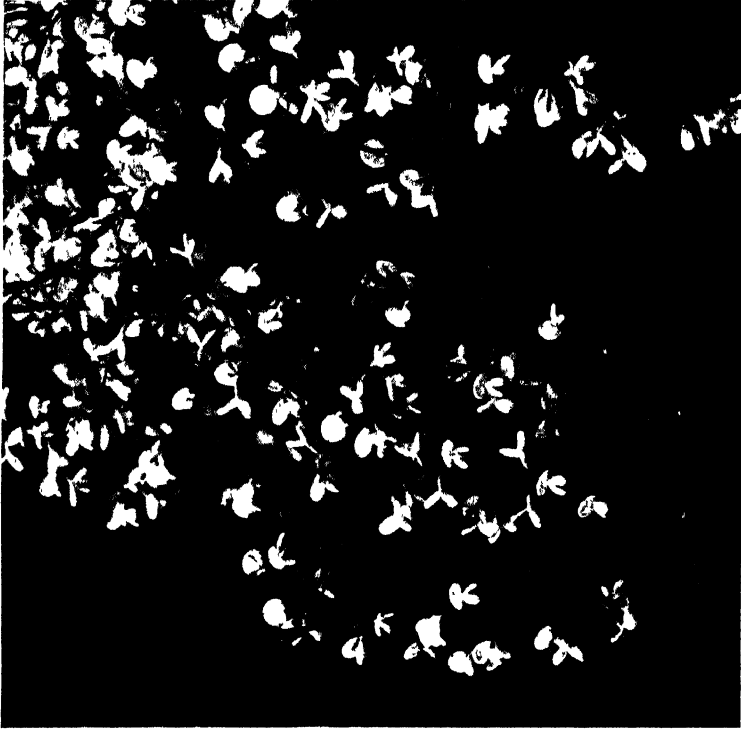


FIG. 31 —GENISTA JANUENSIS.
(See p. 80.)



FIG. 32. PRIMULA MARITIMA.

Showing the effect of adding increasing amounts of superphosphate to a seed compost day, treated alike and photographed together.

(See p. 89.)

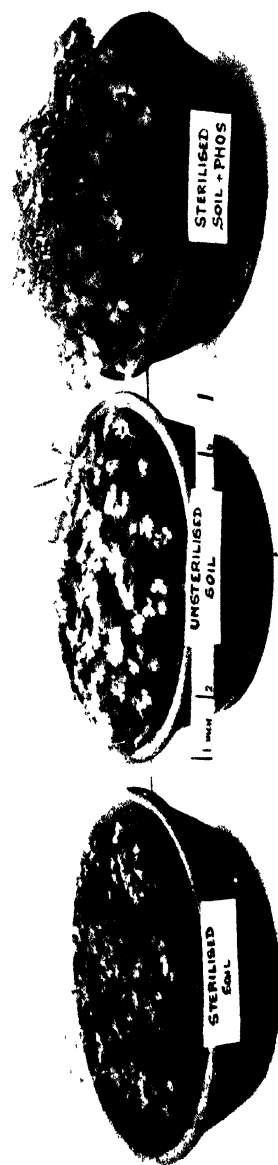


FIG. 33. CELERY.

Note checked growth in sterilized soil and how this check is eliminated if phosphate is added to the sterilized soil. (See p. 89.)



FIG 34.—SWEET CORN

Left.—Various kinds of fungal grain moulds attacking the grains. *Right*.—The grains are clean but the cob is attacked at its base by the grey mould fungus *Botrytis cinerea*

(See p. 97)



FIG 35.—SLAKED BLACK ROT

(*Phytophthora campestris*)

Blackening of the water conducting system easily seen in the cut stem. On right a slanting cut shows ring of black dots or streaks

(See p. 98)



FIG 36.—FROST DAMAGE ON ASPARAGUS.

The stalk on the left is only slightly frosted

(See p. 101)



FIG. 37.—RHIZOMYCE CROWN ROT.
Puccinia rhaponticum)
 The rot shows clearly in the young set on the left
 (See p. 101.)



FIG. 38.—RHIZOMYCE CROWN ROT.
Amillaria malica)
 The fungus is easily seen as white plates or streaks in the
 affected tissues.
 (See p. 102.)

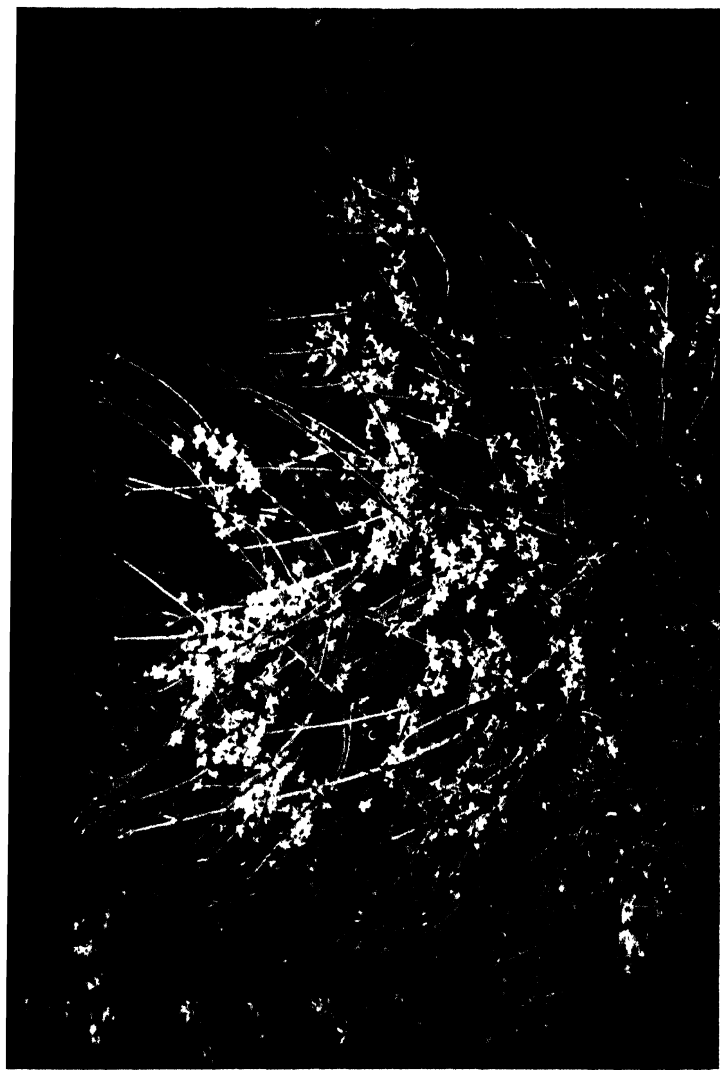


Photo : N. K. Gould]

FIG. 39 -- FORSYTHIA OVATA
A five-year-old plant
See p. 72

Quite rightly, many gardeners are cautious in adopting the J.I. composts, especially as they take a little getting used to. Plants grow without a check from germination to maturity, so that timing must be modified and watering is a little different. Then again, some head gardeners and foremen, when introduced to the new methods, saw that the pleasure of concocting their own composts would no longer be theirs; indeed the potting shed would lose its mystery, and the dignity and prestige of the Master of Ceremonies might suffer in the process!

A more serious objection, however, is the one sometimes heard from the man who "has a way" with plants. He has feared that the use of standardized composts would take the skill out of gardening under glass and reduce it to a mechanical process where the expert craftsman would have little advantage over the less good man. Such a view is quite wrong; and since it denotes a failure to understand the relation of progress to craftsmanship, it may be worth while saying this. Standardization has already been accepted in many ways in horticulture: in glasshouse design, pots, fertilizers, fumigants, sprays and similar things. The gardener has profited considerably from this standardization and there is room for much more. For example, the chaotic assortment of proprietary fertilizers and feeds is totally unnecessary, which is only another way of saying that they cannot all be as good or as cheap as they pretend to be. We have seen how true this is in regard to composts. To put it in a nutshell: good craftsmen need the best tools. In horticulture we need the same standardization of all our materials, including composts, as of our tools. But consistently good results will only be got when there is a skilled craftsman behind the tool. Skill in glasshouse work, as in all gardening, depends chiefly on doing the right thing at the right time; in knowing when to water, ventilate, shade; when to "stop" a plant or feed it; when to take cuttings, and so forth. Standardization, seen aright, should help, not hinder, the "green thumb."

THE YIELDS OF TOMATO VARIETIES IN AN OUTDOOR TRIAL.

By K. MATHER and M. B. CRANE.

John Innes Horticultural Institution, Merton, London.

THE increase in outdoor cultivation of Tomatos, which began as a result of the war and which seems likely to continue in the future, makes it very necessary to have more knowledge of the behaviour of the different varieties in the open. Trials which have been carried out over many years have given us a good knowledge of the indoor performance of most types of Tomato, but there is no reason to believe that these provide any real information as to cropping power outside. Some outdoor trials have been made in the recent past, but their value is considerably reduced as adequate experimental designs have not always been adopted, with the consequence that the validity of apparent differences in yield cannot be judged.

We have earlier described a small 1940 trial in which the outdoor performance of ten varieties was tested (CRANE and MATHER, 1941),* and it was decided to continue this work in 1941 to get information about the same varieties in a different year and to include a larger number of types. The results form the substance of this report.

TABLE I.

Variety.	Yield per Plant to—				Yield per Plant.		Total Yield per Plant. Lb.	Estimated Yield per Acre.
	September 10.		September 17.		Ripe Fruits.			
	Lb.	% Total Crop.	Lb.	% Total Crop.	Lb.	% Total Crop.		
Harbinger	3.57	50.4	4.61	65.1	6.67	94.2	7.08	48 18
Stonor's Exhibition	2.00	28.6	3.23	46.1	6.49	92.7	7.00	48 7
Ailsa Craig †	2.40	35.7	3.57	53.2	6.33	94.3	6.71	46 8
Stonor's Progress	2.62	39.8	3.74	56.8	6.13	93.1	6.58	45 9
Market King	2.96	45.2	4.08	60.8	6.20	96.0	6.54	45 4
Radio †	2.08	32.6	3.19	50.1	5.79	90.9	6.37	44 1
Hundredfold	3.29	51.7	4.26	66.9	6.06	95.3	6.36	43 19
Moneymaker	1.66	26.2	2.69	42.5	5.79	91.6	6.32	43 14
Sunrise	2.65	42.2	3.69	58.7	5.96	95.2	6.28	43 8
Earliest of All	3.33	56.1	4.12	69.5	5.61	94.6	5.93	41 0
Best of All †	1.91	32.3	2.99	50.5	5.62	94.9	5.92	40 19
E.S. 1 †	2.17	36.9	3.19	54.2	5.49	93.3	5.88	40 13
Potentate †	2.27	39.0	3.30	56.7	5.63	96.7	5.82	40 4
Blaby †	2.96	53.6	3.74	67.7	4.99	90.4	5.52	38 3
Fruit	2.50	46.6	3.57	66.6	5.28	98.5	5.36	37 1
Kondine Red †	2.19	44.2	3.15	63.5	4.48	90.1	4.96	34 7
Plumpton King †	1.69	34.3	2.61	53.0	4.53	92.1	4.92	34 0
Buckley †	1.56	35.4	2.11	47.8	4.01	93.2	4.41	30 10

* M. B. CRANE and K. MATHER (1941), *The Fruit Grower*, vol. xci, No. 2363.

† These varieties were grown from our own seed (see text).

The varieties used are listed in Table I. All the strains were originally obtained from commercial sources, but some of them, marked with a dagger in the table, had previously been in cultivation at this institution for one or more generations. In these cases we had adopted the practice of saving seed from the best plants, but it would not appear that a marked change in performance had been brought about by this selection.

Seeds were sown in John Innes seed compost on April 4, 1941, the seedlings being pricked out into boxes on April 15-16, and the plants transplanted into 3-inch pots on May 1-3. John Innes potting compost was used in both boxes and pots. Planting out in the open was carried out on May 29-30.

The previous crop on the land used for the trial was Onions. Before planting, the plots received an application of hoof and horn, superphosphate and potash salts; 4 oz. of each were dug in per square yard. The plants were not watered at the time of setting out, as rain fell immediately the planting was completed. They were, however, watered on July 2, and were given a John Innes "D" feed (analysis: N 6.8, P 1.94, K 1.94) at the rate of 2 oz. per square yard on August 6. This was watered in.

All side growth was removed at an early stage and the main shoot was stopped two leaves above the fifth truss. The leaves up to the second truss were removed at the end of August.

The trial was in the form of four randomized blocks, each block containing 14 plants of each variety arranged in the form of a plot of two rows, each with 7 plants. The plants were 15 inches apart within each row, 27 inches being left between rows. As there were four blocks, 56 plants of each variety were grown in all. Any advantage which plants in outside positions might have were removed by the use of guard rows. Within each block the different varieties were arranged at random. This design allows the error or uncontrolled variation, to which the yields are subject, to be estimated, and prevents the occurrence of any bias in yield such as might follow from the use of a regular arrangement on soil showing a fertility gradient. Furthermore, the use of four blocks reduces the effect of such gradients on the error variation. The yields were subjected to an analysis of variance which clearly demonstrated the value of the four blocks in this respect, and also supplied the estimate of the error variation to which the yields were subject.

Picking at weekly intervals commenced on August 21 in all varieties except 'Radio' and 'Moneymaker,' from which ripe fruit was first obtained a week later. The average yields per plant, up to certain dates and over the whole season, are given in Table I. The varieties are there arranged in descending order of average yield over the whole season, including green fruit. It will be observed that in every case more than 90 per cent. of the fruit ripened outside, and it may be added that approximately four-fifths of the green fruits were ripened by laying in a single layer in a heated greenhouse after picking on

October 15. Thus about 98 per cent. of the fruit was successfully brought to the marketable stage.

'Earliest of All' well justified its name in giving 56.1 per cent. of its total by September 10 and 69.5 per cent. by September 17. 'Blaby,' 'Hundredfold' and 'Harbinger' had also ripened half their crop by September 10. 'Stonor's Exhibition' and 'Moneymaker' had ripened little more than a quarter on that date, but the remaining varieties had all given about a third or more.

In 1940 'Radio' gave the highest yield with an average of 5.94 lb. per plant. In 1941 it gave 6.37 lb., but was exceeded by the new varieties 'Harbinger' 7.08 lb., 'Exhibition' 7.00 lb., 'Progress' 6.58 lb., and 'Market King' 6.54 lb. 'Radio' was, however, also exceeded in 1941 by 'Ailsa Craig' with 6.71 lb. per plant, a variety which in 1940 had been markedly inferior to 'Radio.' 'Plumpton King' also showed curiously contrasting behaviour in the two trials. It was nearly as good as 'Radio' in 1940, but gave a very poor performance in 1941. 'Buckley' was the poorest variety in both years, giving 4.81 lb. per plant in 1940 and 4.41 lb. in 1941.

'Potentate' and 'Buckley' set well on the first two trusses, but in our experience always have poor fourth and fifth trusses, with low numbers of flowers. In the 1941 trial they averaged only 8 flowers on the fourth and 7 on the fifth truss, as against over 16 on the fourth and 10 on the fifth in 'Harbinger' and 'Market King.' Table I shows that these varieties give an appreciably heavier yield outside than do 'Potentate' and 'Buckley.' It may be noted here that any difference of 0.58 lb. or more in the average yields per plant of two varieties can be regarded as fully significant in the statistical sense, since the standard error of such differences is 0.29 lb.

'Ailsa Craig,' 'Exhibition,' 'Radio,' 'Moneymaker,' 'Sunrise,' 'Plumpton King' and 'E.S. 1' all gave fruit which was very uniform in size and shape, averaging from 6 to 8 fruits per lb. At the other extreme the fruit from 'Potentate' and 'Buckley' was of very variable size, some individual specimens weighing from 6 to 8 oz. Fruit shape in these varieties is also poor.

In our trials 'Harbinger,' 'Stonor's Exhibition,' 'Ailsa Craig,' 'Stonor's Progress,' 'Market King' and 'Radio,' both in regard to yield and quality of fruit, have shown themselves preferable to 'Buckley,' 'Kondine Red' and 'Potentate' for outdoor cultivation.

The results of the Outdoor Tomato Trials at Wisley were published in the Society's JOURNAL, Vol. 66, part 12; reprints of these trials are obtainable on application to the Secretary, price 7d., post free.

HARICOT BEANS IN A SUSSEX GARDEN.

By KATHLEEN HELEY, B.Sc., N.D.H.

FEW people thought of growing Haricot Beans as a garden crop before the war. The imported Beans could be purchased cheaply and only a few people realized that Haricots could be produced in this country, and that the Haricot Bean of the grocer was merely the seed of white-seeded varieties of the familiar French Bean. Most of the French Bean varieties commonly grown in this country have coloured seeds, but there are French Beans grown in Europe which have seeds that vary in colour from white to black.

The idea that Haricot Beans can be grown in the garden has by now become familiar to thousands of people, thanks to trials initiated by Dr. H. V. TAYLOR, first in 1939 at various centres throughout the country and in 1940 at the Royal Horticultural Society's Gardens at Wisley. The problem, however, as to whether it is worth while to grow Haricot Beans as a normal garden crop is still not clear to many, and a few facts and figures of a crop grown among other vegetables in a Sussex garden in 1941 may be of interest.

The soil, a poorish silt, was dug over one spade deep in spring, burying weeds and waste matter present on the site. Prior to sowing, the soil was given a dressing of 2 oz. per square yard of a general garden fertilizer. The seeds were sown 4 to 6 inches apart in rows 18 inches apart, and owing to drought conditions and low temperatures sowing was delayed till the end of May and early June. Regular hoeings continued until the plants covered the ground. A cold May followed by extreme heat in June checked early growth, and a period of heavy rains followed causing rapid plant growth and late flowering. It was late, therefore, before any Beans were formed and ripening was delayed till late September; by that time the heavy autumn dews of night and morning kept the plants damp. The dampness did little harm while the plants were left in the ground, and though Botrytis and other moulds were present they did not become widespread until the plants were crowded together in piles or bunches. As soon as the disease was noticed the method of harvesting was altered. The plants were pulled and the Beans shelled out at once, rejecting any decaying or very immature pods. It was only necessary to reject for immaturity the Bean seeds that were still green and juicy, for these were not only very difficult to shell but also shrivel when stored. The shelled Beans were then placed in muslin bags—the sort of bag in which dogs' biscuits are sold are very useful and of the right size—and hung up in a warm, dry, airy place. Where the Beans were very under-ripe and moist it was necessary to examine them once or twice during drying in case mould had started; otherwise the bags were left until the Beans rattled together on being run through the hands, which

showed that they were dry and could be stored without further deterioration.

Three white-seeded varieties only were grown—'Comtesse de Chambord,' 'Inépuisable' and 'White Leviathan.' The times of sowing and harvesting and the crop yield were as follows:—

<i>Variety.</i>	<i>Sowing Date.</i>	<i>Harvest.</i>	<i>Crop per 50-foot run.</i>
'Comtesse de Chambord'	May 30	October 15-30	3 lb. 3½ oz.
'Inépuisable'	1st week June	September 25-30	2 lb. 9 oz.
'White Leviathan'	" " "	October 1-9	4 lb. 12 oz.

No claims are made that any scientific trial was made, so that this is a statement of facts observed on a crop grown without special provision.

The 'Comtesse de Chambord' produced excellent small round pearly white Beans, but the yield was not the highest and harvesting was difficult because the variety ripened very late. 'White Leviathan' gave the heaviest yield; a proportion of the Beans were greenish-grey and others shrivelled in drying, so that the sample was not of good appearance. The crop of 'Inépuisable' was small because it was the first to be harvested and by methods found to be unsatisfactory, and this resulted in a portion of the crop being lost. The sample was excellent.

The yield of Beans is obviously a small crop for a 50-foot row and Haricot Beans are not a suitable crop for small gardens or a small 10-perch allotment. Where land is limited and the space only sufficient to grow the normal requirement in fresh vegetables and roots, these should be grown in preference to Haricot Beans. Where, however, ground is available to grow something more than the normal requirements of vegetables for the household concerned it is probably worth while to grow 6 or 7 lb. (100-150-foot row length) of Haricots rather than extra quantities of vegetables which may, in fact, be wasted.

Haricots have a relatively high protein content; 'Comtesse de Chambord' Beans grown at Wisley* had a protein value of 25.75 per cent., and the other varieties have comparable figures. Though this protein is a second-grade protein, it is very valuable in war time in view of the shortage of other protein foods, such as fish, meat, cheese and eggs. Beans can easily take the place of meat in at least one meal per week.

The dry Beans—a suitable ration is 2½ oz. per person—are soaked in cold water for twelve hours. They are then placed in fresh cold water, salt to taste is added and the water brought to the boil for 20 to 30 minutes or till cooked. After they are cooked, strain off the water and shake the Beans together with a small piece of butter, dripping or margarine while still in the saucepan. Beans and Tomato sauce make a good meal. Soaked Beans may also be used as an addition to soups and stews.

* *Journal of the Royal Horticultural Society*, Vol. 66, part 3, p. 98.

HYGIENE IN THE WAR-TIME VEGETABLE GARDEN.—XIII.

By D. E. GREEN, M.Sc., Mycologist, Wisley.

SWISS CHARD (*Beta vulgaris* var. *cicla*).

THIS plant is not yet commonly grown and records of disease on it are scarce, but it is a vigorous plant when given good cultivation. It has been known to be affected by the Beetroot Downy Mildew, *Peronospora Scachtii* (see Beetroot), and under certain conditions would probably be susceptible to most of the ordinary Beetroot troubles.

SWEET CORN (*Zea mays*).

This is gaining popularity and will probably continue to do so. In southern gardens at any rate it seems to grow vigorously and gives little trouble. So far not much is known of diseases occurring on it in Great Britain, but certain troubles which have been seen this season might be noted here.

GRAIN MOULD.

Under moist conditions the grains in the cob may develop a rot, and when the sheath leaves are removed the affected grains, which may occur singly or in small groups, are seen to be discoloured, first mouse grey and then a dirty brown. In some cases a growth of white fungal threads can be seen on the surface of and between the affected grains (Fig. 34). There are several fungi which may cause this kind of trouble, e.g. Green Moulds (*Penicillium spp.*), *Fusarium spp.*, etc., and in other countries the fungus *Fusarium moniliforme* is supposed to enter in some cases down the styles (silks) or to attack directly through the sheath leaves. At Wisley this season a species of *Alternaria*, as well as various bacteria, have also been noticed in such affected grains. The disease occurs only under very humid conditions, so that the very wet weather this season is probably the reason for its appearance. The spread and consequent damage increases as the grains mature, so that if the cobs are picked for eating the loss is very much reduced, and in any case is not likely to be great except in very wet conditions. Where seed is saved, however, it is best to select only from definitely healthy and clean cobs, for affected ones may contain slightly infected grains which, although they may germinate, are likely to suffer from rotting of the roots and base of the stem. Even though such a plant may grow it is likely to be handicapped by fewer roots and stunted growth and may become very liable to breaking and falling over. If cobs are saved for seed or for feeding poultry, etc., they should be placed in a dry store and the sheath leaves opened up for fear moisture inside encourages grain moulds.

GREY MOULD.

A species of *Botrytis*, probably *Botrytis cinerea*, was also noticed in 1941 to attack the stalks of some cobs and grow forward to affect the base of the sheath leaves and even damage the grains (Fig. 34). It is not likely that such a trouble can occur except in very wet seasons. The Grey Mould fungus usually appears on some injured or dead part of the plant and these sources of infection should always be removed, this point having been emphasized already under Tomatos, Lettuces, etc.

SEAKALE.

Seakale can be considered a strong and vigorous plant which on well-drained and reasonably good soil will grow well and yield good crowns for forcing. It is important that the crowns are healthy when lifted, otherwise under forcing conditions some diseases mentioned here may develop rapidly and spoil the heads.

BLACK ROT.

This disease, caused by the organism *Pseudomonas campestris*, is not common but is occasionally troublesome, especially in warm and wet summers. It attacks, besides Seakale, such plants as Cabbage and Turnip (R.H.S. JOURNAL, January 1942, p. 34), the symptoms being very similar in all. There is a yellowing of leaves and a blackening of the veins, so that the disease is easily recognized if leaf stalks or even stems are cut across, when the water-conducting strands of the vascular system (veins) are seen to be black. On the cut surface, therefore, there shows a black dotted ring. In Seakale the blackening shows clearly in the root of an affected plant and can easily be recognized when the side roots (thongs) are being removed for cuttings (Fig. 35). If the blackened streaky symptoms are seen, the mother crown should not be used for forcing nor should the cuttings be used for planting. Such methods will keep the stock free from Black Rot and avoid loss, because infected crowns are likely to produce poor heads which may soon wither.

SOFT ROT.

This rot is due to *Bacterium carotovorum* and it has already been mentioned on Carrot, Turnip, Celery, etc. It causes a typical soft wet and slimy rot which quickly destroys tender tissues and spreads rapidly under moist conditions. It is, therefore, able to be particularly destructive where there is sufficient warmth and moisture such as in storage clamps or forcing pits or even outdoors if the season is warm and wet (e.g. Turnips). With Seakale the blanched forced heads are easily attacked and rotted by Soft Rot. This occurs generally through wounds, but the Soft Rot organism is also a good follower of Black Rot, so that any weak or withered heads of crowns suffering from Black Rot provide a starting point on which Soft Rot may flourish and spread among the tender forced heads. Extensive trouble may mean that the forcing conditions are faulty (perhaps too wet), but the fact remains

that it is wise to observe strict attention to clean methods and to see that crowns affected by Black Rot or in any way diseased are not included for forcing.

CLUB ROOT.

This disease, due to the Slime fungus *Plasmodiophora Brassicae*, is able to attack Seakale but is not common on this plant. The symptoms and methods of control have already been dealt with under Cabbage (R.H.S. JOURNAL, March 1941, p. 91) and on various other plants in these articles.

DOWNY MILDEW.

The Downy Mildew fungus *Peronospora parasitica* may appear on Seakale foliage, the symptoms being similar to those described for this fungus on Cabbage. It is not likely to be serious on Seakale.

VIOLET ROOT ROT.

This disease, due to the fungus *Helicobasidium purpureum*, forms a felt-like mass of violet or purple growth over the surface of many kinds of roots and root crops and has been described on Carrot (R.H.S. JOURNAL, November 1941, p. 418) and on other roots. Besides damaging Seakale crowns, the fact that it can attack so many other crops makes it advisable that any plant showing this disease be destroyed by burning.

CHICORY.

VIOLET ROOT ROT.

On Chicory there has been recorded an attack by the fungus *Helicobasidium purpureum*, which has been described under Carrot (R.H.S. JOURNAL, November 1941, p. 418) and subsequently mentioned on several other vegetables. Apart from this, Chicory seems to be very free from disease, but, just as for Seakale, it is as well to be particular when selecting Chicory roots for forcing and to obtain advice on any suspicious condition in a root.

ARTICHOKE (JERUSALEM).

The Jerusalem Artichoke is very hardy and should not often suffer from disease, but there are one or two parasites which may attack it.

SCLEROTINIA ROT.

The fungus *Sclerotinia sclerotiorum* may sometimes attack and destroy Artichoke stems and tubers. This fungus forms a typical very white and copious fluffy growth and should be easily recognized because this growth soon forms its resting bodies, known as sclerotia, which are sometimes formed *inside* an affected stem. These sclerotia are at first brown and then black, but quickly become hard. They are rounded or oval in form and vary in size, but may be up to the size of Dwarf Bean seeds. It is essential to burn any affected stems or tubers so as to destroy these resting bodies. This fungus has already

been described and figured on Carrot, and emphasis is there laid on the advisability of destroying it wherever it is seen. Carrots or other roots and tubers (*e.g.* Dahlia tubers) affected by it should not be dug into the garden or thrown on the compost heap, because the sclerotia when in the soil will germinate and can then infect many kinds of vegetables, *e.g.* Potatoes, Lettuces, Artichokes, Carrots, or even Antirrhinums. The disease can be especially destructive among stored root crops in clamps (see under Carrot, R.H.S. JOURNAL, November 1941, p. 418). It must be said that Sclerotinia Rot of Artichokes is most likely in heavy wet and perhaps acid soil, but should not occur in a well-drained and properly limed garden.

ASPARAGUS.

VIOLET ROOT ROT.

This disease may occasionally attack Asparagus, the roots of which become covered with the purplish-violet coloured web-like strands of the fungus, so that the foliage wilts and the plant eventually dies. The fungus parasite *Helicobasidium purpureum* is a well-known soil fungus which has been seen attacking many kinds of plants and has already been figured and described in these articles on Carrot (R.H.S. JOURNAL, November 1941, p. 418), on Beetroot, Seakale, etc. This fungus is usually very persistent in soil and is not easy to control, especially as it may live on many different kinds of plants. For instance, besides attacking vegetables such as Beetroot, Carrot, Seakale, Potato, it affects roots of Dock, Dandelion, etc. Chemical treatments of contaminated soil have been tried but none are very effective. In the case of an Asparagus bed where the trouble starts it is best to dig out the affected plant and the plants near it as carefully as possible and burn them. As the soil may remain contaminated for some years it would be advisable to plant up a new bed of healthy young plants on another site, during which time the infected vacant patch could be cropped with a non-susceptible crop such as Brassicas.

RUST.

Asparagus Rust is due to the fungus *Puccinia Asparagi*, but the disease is now not very common in Great Britain and occurs only in two or three localities. All the stages of this rust fungus are produced on the Asparagus plant, the most obvious being the summer (uredo) and the autumn (teleuto) stages. The first shows in late summer as a rusty brown powdery coloration on the needles, and the second in autumn as black streaks on the stems. Where severe, the check to the plants weakens them and reduces the buds for cutting in spring. The third stage of the rust (which is necessary for it to complete its life cycle) occurs on the buds in spring, which are infected by the autumn spores (teleutospores) lying on the ground or in fallen needles and pieces of shoot. Although this rust is not common in gardens, at any sign of its appearance the feathery shoots in summer should be cut down early and burnt so as to prevent the formation and release

of the autumn spores. If noticed on a young bed, spraying with Bordeaux should be carried out as well as early-removal of the tops.

FROST DAMAGE (PINCHED NECK).

In some districts late frosts may be responsible for much loss in Asparagus. When the tender young shoots are severely injured by frost the upper part becomes limp and the tissues soon turn watery and blacken. It is not long before the affected shoot (which will still lengthen) shows above the surface of the soil, dries out and soon gets thin, withered, straw-coloured and bent over. This appearance is easy to recognize, but sometimes the shoots are only partially injured by the frost and become slightly shrivelled and constricted about soil level, so that an inch or two of the top remains green but below this the shoot is withered (Fig. 36). Such slightly affected shoots are often difficult to recognize, but if left they slowly deteriorate and grow malformed. They are not very suitable for eating although they may look fairly normal just after the frost damage.

RHUBARB.

CROWN ROT.

This is perhaps the only disease likely to be serious in a stock of Rhubarb, most other troubles of this plant being very minor ones. Crown Rot is caused by the organism *Bacterium rhaponticum*, and the symptoms are a gradual failing in health due to increasing rotting of the inner tissues below the crown. This may go on for some time. Externally the signs are that the leaf is dull in colour and the terminal bud dies, and when the trouble is severe only small spindly sticks are produced from side buds and the whole crown may easily be kicked or pulled off. If an affected plant is cut open an area of flesh below the crown is seen to be affected by a brownish rot, usually below a bud (Fig. 37). This rot extends and turns darker, so that it may become black, and in the end there may be a blackened cavity. This, however, must not be confused with natural hollowing of old roots which may be seen in some varieties although healthy. This disease may not be very severe in the open ground, but when affected roots are lifted and forced the conditions of forcing are such that the disease will make rapid progress. In any case this trouble is not desirable even in the garden and may become a nuisance where the soil is heavy and wet. Where a plant is found to be infected it is best destroyed, and where a root is divided up for sets to increase the stock the opportunity can be taken to examine the cut surfaces to make sure the inner tissues are healthy. If there is much of the disease the plants should be discarded and fresh healthy sets (or seed) planted on fresh ground.

Root Rot.

There are instances of Rhubarb being attacked by the Honey Fungus (*Armillaria mellea*). This fungus is a well-known soil parasite which attacks the roots of many kinds of trees and shrubs but is only

occasionally seen to damage certain vegetables, one of which is Rhubarb. In cases where the Honey Fungus does damage it is very often the case that the affected plants have been damaged or weakened by some unsuitable soil condition such as heavy wet soil which is waterlogged for long periods in winter. This enables the fungus to invade the roots. In Rhubarb the plants begin to die, and when the root is split open the fungus is easily seen as its threads grow in thick white layers through the tissues, giving a very obvious streaky appearance (Fig. 38). Later on the toadstool-like, honey-coloured fruiting bodies of the fungus may appear on the top of the dead root. It is necessary to burn such roots. Despite weakness due to unsuitable soil conditions it must be remembered that the fungus must be present to infect, and one of the commonest reasons for its presence is that old infected roots from trees, etc., are left in the soil when land is cleared. Where a hedge, such as privet, or old trees, such as fruit trees, are removed to make a garden all roots possible should be removed and burnt. In any case, this disease is not common in Rhubarb and should not occur on well-drained, reasonably good soil.

GREY MOULD.

The Grey Mould fungus, *Botrytis cinerea*, may attack forced Rhubarb owing to inadequate ventilation and excessively moist conditions. Even in the open air in wet seasons there may be some damage from this well-known fungus. Among the forced sticks some effort should be made to improve the air conditions so as to get rid of excessive moisture, besides which every piece of dead or dying infected leaf or stalk ought to be carefully removed. In the open the trouble is very dependent on moisture and should disappear with the coming of dry weather.

LEAF SPOT.

Many people will have seen spotting of Rhubarb leaves, most of which is caused by the fungus *Ramularia rhei*. This fungus causes irregular-shaped brown spots all over the leaves. They are sometimes very abundant but usually are of little consequence and do not appear to cause much damage to this hardy plant.

FROST DAMAGE.

Despite its hardiness, even open-air Rhubarb can be injured by frost in spring. The result may be seen in silvering of the leaves, but in very severe late frosts (e.g. that of May 1941) the injury may be much greater and the leaves become browned and killed, their stalks being quite limp and afterwards rotting. Where Rhubarb is much valued it would be advisable to give a little protection with straw or similar covering against the possibility of late frost damage.

THE AWARD OF GARDEN MERIT.—LXIII.

286. *AETHIONEMA GRANDIFLORUM*.*Award of Garden Merit, July 18, 1938.*

Crucifers are not one of the most popular groups in the garden, being either dull and utilitarian or else coarse and uninteresting in growth, though there are, of course, exceptions such as *Arabis*, *Aubrietia*, *Alyssum* and the indispensable Wallflower. But the *Aethionemas* are all of neater habit, semi-shrubby, forming clumps in suitable positions, for they come from the south, from the Levant, Persia and the Caucasus, and need a rich well-drained soil, usually with lime, in full sunshine. They are excellent plants for the rock garden and will prove perfectly hardy in the scree or on a sunny ledge.

The most effective species is *Aethionema grandiflorum*; it has the largest flowers of the race, a beautiful pink in colour, carried in loose spikes. The plant branches only from the base, each branch being up to 12 inches long, sometimes erect, more often semi-prostrate with the flowering tips ascending; the leaves are slender and bluish-grey. Owing to the facility with which it hybridizes, especially with *A. coridifolium*, *A. grandiflorum* appears somewhat variable in gardens. It is easily propagated by seeds or cuttings.

NARCISSI AT WISLEY, 1941.

THE number of varieties grown at Wisley in the trials numbered one hundred and seven. Of these thirteen had been selected for trial, as varieties suitable for garden decoration, by the Narcissus and Tulip Committee since 1936; the remainder were grown for comparison. Most of these had received awards in previous years.

All the Awards indicated below, with one exception, are "for garden use."

The site of the trial was the same as in previous years, at the western end of Seven Acres. Twenty-five bulbs of each variety were planted in a clump, the clumps being interspersed among widely planted shrubs.

All the bulbs were given the hot water treatment before planting to ensure that neither eelworm nor the larva of the Narcissus flies should interfere with their growth.

DIVISION 1A.—TRUMPET DAFFODILS.

Musketeer (raised and sent by W. B. Cranfield, Esq., East Lodge, Enfield Chase, Middx.). A.M. April 28, 1941.—Previously named

'Ormolu' and as such is described R.H.S. JOURNAL, 61, p. 303. (H.C. 1936.)

The following variety has been retained for future judgment: **KANDAHAR** (G. L. Wilson).

The following variety has been discarded: **SIR FRANCIS DRAKE**.

DIVISION 1B.

The following variety has been discarded: **WILLIAM**.

DIVISION 2A.—INCOMPARABILIS.

The following varieties have been retained for future judgment: **CHEERIO** (Williams), **VELVETEN** (Habershon).

DIVISION 2B.

Glencoe (raised and sent by Messrs. R. H. Bath, Ltd., Wisbech, Cambs.). C. April 28, 1941.—Stem 17 inches. Flower 4 inches wide; perianth overlapping for $\frac{1}{4}$ of length, flat, creamy-white; corona $1\frac{1}{2}$ inch deep, crenate, Canary Yellow (H.C.C. 2/3) fading to creamy-white. Flowers in first year 38, in third 49.

DIVISION 3A.—BARRII.

Gulliver (raised by the late P. D. Williams, Esq., and sent by Messrs. Farrow and Sons, Holbeach, Lincs.). C. April 28, 1941.—Stem 16 inches. Flower $3\frac{1}{2}$ inches wide; perianth $1\frac{1}{8}$ inch long, flat, overlapping, regular, Dresden Yellow (H.C.C. 64/2); corona $\frac{7}{8}$ inch deep, basin-shaped, Aureolin (H.C.C. 3), broadly edged with Marigold Orange (H.C.C. 11). Flowers 31 in first, 59 in third year.

DIVISION 3B.

Prince (introduced by Messrs. A. T. van Graven, and sent by Messrs. R. H. Bath, Ltd., Wisbech, Cambs.). H.C. April 28, 1941.—Stem 26 inches. Flower $3\frac{1}{2}$ inches wide; perianth $1\frac{1}{2}$ inch long, flat, overlapping, regular, creamy-white; corona $\frac{1}{8}$ inch deep, saucer-shaped, bright Aureolin (H.C.C. 3/2), edged Fire Red (H.C.C. 15). Flowers in first year 36, in third 49.

DIVISION 4A.—LEEDSII.

The following variety has been retained for future judgment: **ERIC** (Bath).

DIVISION 5A.—TRIANDRUS HYBRIDS.

The following variety has been retained for future judgment: **HAPPY EASTER** (Bath).

DIVISION 5B.

The following variety has been retained for future judgment: **JOY BELLS** (Copeland).

DIVISION 6.—CYCLAMINEUS HYBRIDS.

Fairy Wings (raised and sent by Mr. G. S. Crouch, Fairseat Nurseries, Wrotham). C. April 8, 1941, as a variety for the rock garden.—Stem 9 inches. Flower 2 inches wide; perianth 1 inch long, flat, reflexed, overlapping, Sulphur Yellow (H.C.C. 1/3); corona $\frac{7}{8}$ inch deep, basin-shaped, Aureolin (H.C.C. 3/1). Flowers in first year 23, in third 43.

DIVISION 7.—JONQUIL HYBRIDS.

Golden Perfection (raised and introduced by Messrs. de Graaff Bros., Ltd., and sent by Messrs. Farrow and Sons, Holbeach, Lincs.). H.C. April 28, 1941.—Stem 18 inches. Flower $3\frac{5}{8}$ inches wide; perianth $1\frac{1}{2}$ inch long, flat, overlapping, Dresden Yellow (H.C.C. 64/1); corona $\frac{7}{8}$ inch deep, expanded, Lemon Yellow (H.C.C. 4). Flowers in first year 35, in third 44.

DIVISION 8.—TAZETTAS.

The following variety has been retained for future judgment: **OWL** (Copeland).

DIVISION 9.—POETICUS VARIETIES.

The following variety has been retained for future judgment: **LAMPLIGHTER** (G. L. Wilson).

DIVISION 10.—DOUBLE VARIETIES.

The following variety has been retained for future judgment: **MRS. WILLIAM COPELAND** (Copeland).

BEARDED IRISES AT WISLEY, 1941.

THE trial of Bearded Irises at Wisley was continued on the same lines as in previous years, and this report deals with the Awards made in 1941, follows the same classification as in previous reports, and indicates the varieties acquired since the publication of the previous report.

The trial is judged by a Joint Committee consisting of representatives of the Royal Horticultural Society and the Iris Society, who also select varieties for trial at Wisley, and make their recommendations for Awards. The name in brackets after the variety indicates the raiser.

The Dykes Memorial Medal for 1941, awarded by the Iris Society, was gained by Mr. H. Chadburn's variety **Mabel Chadburn**.

CLASS I. FLOWERS WHITE.

June Crystal (raised and sent by Miss L. F. Pesel, Winchester). A.M. June 20, 1941.—Of vigorous growth and very rapid ~~growth~~ ^{rise}, with erect glaucous-green foliage, 24 inches high. Flower stems 50 inches high, erect, straight, 8-flowered. Flowers large, well

proportioned, stiff. Standards domed, $2 \times 2\frac{1}{8}$ inches, white. Falls drooping, $2 \times 2\frac{1}{8}$ inches, white with pale yellow veins on haft. Beard white, tips of hairs orange. Flowering for fourteen days from June 16. ('San Francisco' \times 'Byzantium'.)

The following varieties have been added for future judgment : BRIDAL VEIL (Mitchell), SNOW WHITE (Stern), ST. AGNES (Meyer), ST. COLOMBE (Meyer), WHITEHALL (Murrell).

CLASS IIIB.

The following variety has been added for future judgment : WABASH (Mary Williamson).

CLASS IVA.

Fanfare (raised and sent by Messrs. Barr and Sons, Taplow, Bucks.). **A.M.** June 20, 1941.—Of vigorous growth and rapid increase, with erect glaucous-green foliage, 20 inches high. Flower stems 36 inches, erect, straight, 8-flowered, short branches. Flowers large, well proportioned, stiff. Standards domed, $2\frac{3}{4} \times 2\frac{7}{8}$ inches, Aster Violet (H.C.C. 38/2). Falls straight hanging, $2\frac{1}{2} \times 2\frac{3}{8}$ inches, inclined to be pinched, Aster Violet (H.C.C. 38) at beard, fading to (H.C.C. 38/1) on remainder of the falls, veins on haft distinct on white, brownish. Beard bluish-white, tips of hairs yellowish. Flowering for twelve days from June 14.

The following variety has been added for future judgment : NORVEG (Murrell).

CLASS IVB.

The following varieties have been added for future judgment : CHALLENGER (Sass), MORNING GLORY (Kirkland), LATONA (Barr), SOLARIO (Barr), PASHA (Barr).

CLASS IVC.

Nina Levett (raised by Miss P. Levett, Beccles, Bulls, New Zealand, and sent by the Orpington Nursery Co., Orpington, Kent). **A.M.** June 20, 1941.—Vigorous and of rapid increase, with erect, glaucous-green foliage, 24 inches high. Flower stems 48 inches high, erect, somewhat zigzagged, 8-flowered. Flowers extra large, stiff and well proportioned. Standards domed, $3\frac{1}{4} \times 2\frac{3}{4}$ inches, approaching Imperial Purple (H.C.C. 33/2). Falls straight hanging, pinched, $3 \times 2\frac{1}{2}$ inches, a tone of Imperial Purple (between H.C.C. 33/1 and 33/2), veins distinct, brownish on haft. Beard orange. Flowering for ten days from June 18. ('J. B. Dumas' \times 'Aurelle'.)

CLASS VA.

The following varieties have been added for future judgment : ANDALUSIAN BLUE (Schreiner), EXCLUSIVE (Grant), GLEAM (Nicholls), BLUE ENSIGN (Meyer), BLEUÂTRE (Meyer), BLUE NILE (Pilkington), ST. OSYTH (Meyer).

CLASS VB.

The following varieties have been added for future judgment : BLACK WINGS (Kirkland), WAVERLEY (Williams).

CLASS Vd.

The following variety has been added for future judgment : ROSE VIOLET (Kirkland).

CLASS VIA 2.

The following variety has been added for future judgment : YUCATAN (Kirkland).

CLASS VIB.

The following variety has been added for future judgment : PIUTE (Thomas).

CLASS VIC 1.

Brengwain (raised and sent by Messrs. Barr and Sons, Taplow, Bucks.). A.M. June 20, 1941.—Plant vigorous and of rapid increase, with erect glaucous-green foliage, 24 inches high. Flower stems 40 inches tall, erect, straight, 10-flowered. Flowers large, stiff and well proportioned. Standards cupped, $2\frac{1}{2} \times 2\frac{3}{8}$ inches, smoky greyish-lavender-violet, very narrowly edged with reddish-purple, base light yellowish-bronze. Falls drooping, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, deep rich velvety wine-purple, veins brownish on creamy-white on haft. Beard white, upper half of hairs pale yellow. Flowering for ten days from June 18. ('Reverie' \times 'Dominion.')

The following varieties have been added for future judgment : CHEERIO'S BROTHER (McL. Ayres), DEREK MEYER (Meyer), MARY ELIZABETH (Kirkland).

CLASS VIC 2.

The following varieties have been added for future judgment : AT DAWNING (Kirkland), MAGNETEWAN (Kirkland), SONNY BOY (Kirkland).

CLASS VIId.

The following varieties have been added for future judgment : CHINA LANTERN (Essig), OLD SEVILLE (Murrell).

CLASS VIIIA.

Mabel Chadburn (raised and sent by Haworth Chadburn, Esq., Middleton, Saxmundham, Suffolk). F.C.C. June 20, 1941.—Vigorous and of rapid increase, with erect glaucous-green foliage, 20 inches tall. Flower stems 38 inches tall, erect, somewhat zigzagged, 8-flowered. Flowers large, stiff, well proportioned. Standards domed, $2\frac{1}{2} \times 2\frac{3}{8}$ inches, approaching Empire Yellow (H.C.C. 603/1), with flecks and shading of a darker tone at centre. Falls drooping, $2\frac{1}{2} \times 2\frac{3}{8}$ inches, waved at margins a darker tone of Empire Yellow (H.C.C. 603) with paler margins. Beard orange. Flowering for twelve days from June 18. ('Golden Hind' \times unnamed Seedling.) Dykes Memorial Medal for 1941.

Joan Lay (raised and sent by Haworth Chadburn, Esq.). A.M. June 20, 1941.—Plant vigorous and of rapid increase, with erect glaucous-green foliage, 24 inches high. Flower stems 48 inches tall, erect, straight, 8-flowered, branches long. Flowers large, well proportioned, stiff. Standards domed, $2\frac{1}{2} \times 2\frac{1}{2}$ inches, waved, clear golden-yellow. Falls drooping, $2\frac{1}{2} \times 2\frac{3}{8}$ inches, clear golden-yellow,

faintly tinged greenish at middle, with pronounced veins on the haft. Beard orange. Flowering for twelve days from June 14. ('Purissima' × 'Gold Imperial' × 'Golden Hind.')

The following varieties have been added for future judgment: GOLDEN BEAR (Mitchell), GOLDEN BOW (Sass), GOLDEN HIND SEEDLING (Chadburn), PURISSIMA SEEDLING (Chadburn).

CLASS VIIIB.

The following varieties have been added for future judgment: GOLDEN ARROW (Meyer), ROYAL SCEPTRE (Muttell), ROYAL STANDARD (Muttell), ST. CRISPIN (Meyer), ST. HILARY (Meyer).

UNCLASSIFIED.

AMIGO (Williamson), BITTERSWEET (Muttell), BLUE PETER (Stern), CLEO (Muttell), DUBROVNIK (Williamson), FESTIVE (Morrison), INDIAN HILLS (Grant), MASQUE (Cayeux), RAMUNTCHO (Cayeux), RED ROVER (Meyer), RETTA (Lapham), SEEDLING 24 (Cranfield), SEEDLING 47 (Cranfield), SONIA (Barr), ST. ALBAN (Meyer), ST. DENYS (Meyer), ST. JOAN (Meyer).

DELPHINIUMS AT WISLEY, 1941.

ONE hundred and twenty-five varieties were grown in the trials at Wisley during 1941; of these 25 varieties belong to the Belladonna type, the remainder fall in the Elatum group.

The plants, raised from cuttings in the spring of 1940, were grown in groups of three of a variety and were judged without disbudding or thinning of the flower spikes, by the Joint Committee of the Royal Horticultural Society and the British Delphinium Society, whose recommendations for Awards are given below.

The varieties are grouped in the report according to the type—Belladonna or Elatum—whether the flowers are single, semi-double or double, and according to the colour group to which they belong, the colour being determined by the general appearance of the variety in the garden.

The report serves to indicate the present state of the trials, varieties to which Awards have been granted in 1941, varieties retained for comparison (against which new varieties as they are selected for trial are judged) and those for future judgment, and varieties discarded, those which the judges consider to be superseded.

BELLADONNA TYPE.

Flowers White.

The following variety has been retained: MOERHEIMII (A.M. 1935).

Flowers Pink.

Pink Sensation (raised by Messrs. B. Ruys and sent by Messrs. W. H. Simpson and Sons, 209 Monument Road, Birmingham). A.M. June 28, 1941, for garden decoration.—3 feet; spikes 9 to 15 inches long; side spikes few, strong; flowers single, 1½ inch diameter, Crimson (H.C.C. 22/2); eye small, white and pale violet.

Flowers Pale Yellow.

The following varieties have been retained: **BELLADONNA SEMIPLENUM** (A.M. 1933), **BLUE BEES** (A.M. 1935), **CAPRI** (H.C. 1925), **PERSIMMON** (H.C. 1925), **MUSIS SACRUM** (A.M. 1935), **FANNY STORMOUTH**, **NASSAU** (H.C. 1925).

Flowers Dark Blue.

Wendy (sent by Messrs. W. H. Simpson and Sons, 209 Monument Road, Birmingham). A.M. June 28, 1941, for garden decoration.—3½ feet; spikes 18 to 24 inches long; side spikes few, strong; flowers single, 2 inches diameter, a tone of Gentian Blue (between H.C.C. 42 and 42/1), side petals flushed with Cyclamen Purple (H.C.C. 30/1); eye of medium size, creamy-white with gentian blue, hairs yellow.

The following varieties have been retained: **ARNOLD BÖCHLIN**, **ORION** (A.M. 1937), **ISIS** (A.M. 1933), **LAMARTINE** (A.M. 1935), **MRS. THOMSON** (A.M. 1925), **NAPLES** (A.M. 1935), **THEODORA** (A.M. 1933), **SALLAND**, **LUGANO**, **MERLIN**, **CYPSONI**, **ANDENKEN AN AUGUST KOENEMANN**, **AZURE QUEEN**, **BLAUTANNE**, **J. S. BRUNTON** (A.M. 1935).

ELATUM TYPE.

SINGLE.

Flowers Pale Blue.

The following varieties have been discarded: **BLUE PRINCE** (A.M. 1935), **MRS. TOWNLEY PARKER** (A.M. 1933).

Flowers Dark Blue.

The following variety has been retained: **BLUE BEAUTY** (A.M. 1935).

The following varieties have been discarded: **BLUE BOY** (A.M. 1925), **CONSTANCE** (A.M. 1925).

Flowers Blue and Mauve.

The following variety has been discarded: **MRS. PITTS** (H.C. 1935).

Flowers Violet and Purple.

The following variety has been discarded: **VIOLET QUEEN** (A.M. 1933).

SEMI-DOUBLE.

Flowers White.

The following varieties have been retained: **LADY BELINDA**, **GISHURST GEM**.

Flowers Yellow.

Primrose (raised and sent by Messrs. Blackmore and Langdon, Bath). A.M. June 28, 1941, for garden decoration.—4½ feet; spikes 18 to 24 inches long, tapering; side spikes few, strong; flowers semi-double, 2½ inches diameter, white flushed Primrose Yellow (H.C.C. 601/3); eye small, Primrose Yellow (H.C.C. 601/2).

Flowers Pale Blue.

The following varieties have been retained: **CLARRISSA** (A.M. 1935), **DAY-DREAM**, **LADY EMSLEY CARR** (A.M. 1933), **LADY HOLT** (A.M. 1937).

Flowers Dark Blue.

The following varieties have been retained: A. J. MOIR (A.M. 1935), BLUE SPIRE (A.M. 1937), BLUE GOWN (F.C.C. 1935), ITALIA (A.M. 1937), LUCRETIA (H.C. 1937), ROMEO (A.M. 1935).

Flowers Mauve.

Jean Smith (raised and sent by Messrs. Bees, Ltd., Chester). H.C. July 5, 1941, for garden decoration.—5 feet; spikes 24 to 30 inches long, tapering; side spikes few, strong; flowers semi-double, $2\frac{1}{4}$ inches diameter, inner petals a tone of Mauve (H.C.C. 533/3), outer Butterfly Blue (H.C.C. 645/3) flushed Mauve; eye large, white with pale yellow hairs.

The following varieties have been retained: B. M. GURTEEN (H.C. 1937), BERYL, CHAMINADE, LADY BERTHA (A.M. 1935), LADY CLARA (A.M. 1935), LADY EDITH, LADY GUINEVERE (A.M. 1935), LADY MAY, MAY LANG, TITANIA.

The following variety has been discarded: MRS. SHIRLEY (A.M. 1933).

Flowers Pale Yellow and Pale Mauve.

Viscountess Harcourt (raised and sent by Messrs. Blackmore and Langdon). A.M. July 5, 1941, for garden decoration.—Described JOURNAL R.H.S., 68, p. 89. (H.C. 1935.)

Robina Bickerton (raised and sent by Mrs. R. E. Docwra, Surbiton, Surrey). H.C. July 5, 1941, for garden decoration.— $3\frac{1}{2}$ feet, of compact habit; spikes 15 to 18 inches long, blunt; side spikes few, weak; flowers semi-double, $2\frac{1}{4}$ inches diameter, outer petals a tone of Butterfly Blue (H.C.C. 645/1), inner of a similar tone but flushed with Mauve (H.C.C. 633/2); eye small, white with yellow hairs.

The following varieties have been retained: CAMBRIA (A.M. 1930), CHARLES GREEN (A.M. 1937), CRYSTAL, DAWN (A.M. 1933), LADY BARBARA (A.M. 1935), LADY DIANA (A.M. 1935), LADY DOROTHY (A.M. 1935), LADY ELIZABETH (H.C. 1937), LADY ELEANOR (F.C.C. 1937), LADY JOAN, LADY KATHLEEN (A.M. 1935), LAURA FAIRBROTHER (A.M. 1935), MILLICENT BLACKMORE (A.M. 1925), MRS. FOSTER CUNLIFFE, MRS. HARGREAVES (A.M. 1937), MRS. NEWTON LEES (F.C.C. 1935), MYRA, NORA FERGUSON (A.M. 1933), ROBBIE (A.M. 1935).

The following varieties have been discarded: GOUNOD, HUNSDON DELL (H.C. 1935), SCHUBERT.

Flowers Dark Blue and Mauve Shades.

Lorna (raised and sent by Messrs. Blackmore and Langdon). A.M. July 5, 1941, for garden decoration.—6 feet; spikes 24 to 30 inches long, somewhat tapering; side spikes few; flowers semi-double, rounded, $2\frac{1}{4}$ inches diameter, petals French Blue (H.C.C. 43/1) flushed Petunia Purple (H.C.C. 32/2); eye of medium size, brown.

Natalie (raised and sent by Messrs. Blackmore and Langdon). A.M. July 5, 1941, for garden decoration.— $6\frac{1}{2}$ feet; spikes tapering, 30 to 36 inches long, freely produced; side spikes few; flowers semi-double, $2\frac{1}{4}$ inches diameter, a tone of Spectrum Blue (H.C.C. 45/2) flushed Bishop's Violet (H.C.C. 34/3); eye of medium size, dark brown.

The following varieties have been retained: BLUE COCKADE, CHARMING (H.C. 1937), D. B. CRANE (A.M. 1933), DONALD ALLAN (A.M. 1937), DUCHESS OF PORTLAND (A.M. 1937), F. W. SMITH (A.M. 1935), GRAY LADY, LADY MARGARET, LADY ROSE (A.M. 1937), LADY SUE (H.C. 1937), LORD DERBY (A.M. 1925), MADGE (A.M. 1937), MASSENET, MONARCH OF WALES (A.M. 1925), NAOMI, PHILIP BUTLER (A.M. 1933), PORTHOS, PRINCESS ELIZABETH, ROSE MARIE (A.M. 1933), THE SHAN (H.C. 1925).

The following varieties have been discarded: EXCALIBUR (H.C. 1935), POMPADOUR (A.M. 1937), WILL SHAKESPEARE (H.C. 1935).

Flowers Purplish-Mauve.

The following varieties have been retained: ELIZABETH RICKETT (A.M. 1937), GERALD HOWSE (A.M. 1935), PURPLE PRINCE, RANDOLF (A.M. 1937), VIOLETTA.

The following variety has been discarded: GEORGE COCHRANE.

Flowers Violet and Purple Shades.

The following varieties have been retained: EMPEROR (H.C. 1933), GRAHAM SETON, H. C. STANFORD, LADY AMY (A.M. 1935), REV. E. LASCELLES (A.M. 1933), SIR DOUGLAS HAIG, SIR NEVILLE PEARSON (A.M. 1935), VIOLET ROBINSON (A.M. 1935), WALES, WELSH BOY (H.C. 1935).

Double Varieties.

The following variety has been retained: LADY BATH.

BOOK REVIEWS.

"The Succulent Euphorbieae (Southern Africa)." By Alain White, R. Allen Dyer and Boyd L. Sloane. 2 vols. 4to. 990 pp. Ill. (Abbey Garden Press, Pasadena, California; British Agents, L. Reeve & Co., Ashford, Kent. 1941.) £3 6s.

Most growers of succulent plants will already be familiar with "The Stapelieae," that excellent monograph on the Stapelias produced by Alain White and Boyd L. Sloane. Now these two authors, in collaboration with Dr. Dyer of Pretoria, have performed a similar service for another group of succulent plants, the Euphorbias. "The Succulent Euphorbieae," in two volumes, gives a comprehensive survey of the species in Southern Africa, the area included being all the Union of South Africa, Swaziland, Basutoland, South West Africa, the Bechuanaland Protectorate, Southern Rhodesia, and all except the northern end of Portuguese East Africa. As the book is designed chiefly to help growers and collectors of these plants this area covers the majority of the most interesting forms, those in which the succulent habit is most highly developed.

The structure of plant and flower are fully dealt with in the Introduction, which also includes an historical account of the work done on the genus by the many botanists and collectors who have been attracted by the curious forms developed among these plants. Nineteen keys are included, to help in the identification of species, but in using the keys it must be remembered that marked changes of habit may occur under the artificial conditions of cultivation; the inflorescence is the most reliable guide.

The rest of the two volumes consists of descriptions of the individual species together with the illustrations which are an important feature of the book. Illustrations of plants growing in their natural habitat will, in some cases at least, be surprising to growers who are familiar with them only as small specimens in pots. The photographs are excellent and have been remarkably well reproduced. Plates in colour are also included; most of these are reproductions of water-colour drawings by Miss Cynthia Letty and are very faithful and beautiful interpretations of the plants they represent. In all there are 1,102 black-and-white illustrations and 24 plates in colour.

A glance at the Bibliography at the end of the book will show the reader, if he is in any doubt, in how great a measure he is indebted to the authors of this work for the careful and painstaking manner in which they have collected together the often widely scattered information and arranged it in an orderly way so

that even the grower who is no botanist will be able to learn a great deal about the plants in which he is interested, whilst the botanist will have no cause to complain of unscientific presentation. It is indeed a remarkable piece of work, remarkably well carried out. V. H.

"Vegetables." By André L. Simon for the Wine and Food Society. 8vo. 136 pp. 6s.

This is most probably the most knowledgeable of all books concerned with the cooking of vegetables, and it contains information about a large number of edible plants unfamiliar to English readers, though a few of them, like Pi-Tsai or Chinese Cabbage and Poke weed, are beginning to be found in the gardens of those who are not averse to culinary experiments. The book begins with some sound general advice on the cooking of vegetables and then proceeds to deal with the different plants alphabetically, giving a large variety of recipes for the standard products of the kitchen garden. Some of the French and American treatments are almost unknown in this country and read very attractively. But alas! these are hard times for the gourmet, and too often the mouth-watering recipe is calling for eggs, butter and cream that simply are not available. Red Cabbage, for example, can furnish one of the most savoury vegetable dishes, but it must be compounded with butter (better still goose fat), Onions and Apples and a little red wine! So many of the root vegetables again should be fried after being parboiled, but few of us have fat to spare for such purposes. However, this is a book containing plenty of ideas of value to-day to the possessors of gardens, for it is important to use vegetables more freely and therefore to render them attractive. But whether the recipes are simple or such as must be put aside for better days they can be trusted, for they have been passed by Mr. André Simon and have not been put together "on paper" without the test of experience.

"Practical Herb Growing." By D. G. Hewer. 8vo. vii + 95 pp. (G. Bell & Sons, Ltd., London, 1941.)

This is a useful little book on growing herbs both for the private garden and for the market. Amongst "herbs" the author includes a few medicinal plants, such as Foxglove and Henbane, and also those plants grown for their essential oils, such as Lavender, Peppermint and Camomile. Some of these are now in demand and can profitably be collected in districts where they are to be found wild, but it is advisable to be cautious and to get advice before setting out to grow them commercially. There are chapters on cultivation, drying and preparation for market. The latter half of the book deals with the individual plants, and the author gives the very necessary advice to see that the right strain is obtained before planting, because there are many different varieties of even the commoner herbs.

"William Curtis, 1746-1799." By W. Hugh Curtis. Demy 8vo. 160 pp. (Warren & Son, Ltd., Winchester, 1941.) 10s. 6d.

The name of William Curtis is familiar to botanists and gardeners of many generations through the publication which, begun by him in 1787, has been continued to this day—Curtis's *Botanical Magazine*. Various memoirs have been published from time to time, but the present work collects together the known facts of Curtis's life, some two hundred letters addressed to him by various correspondents forming the basis of the work; notes on his son-in-law, Samuel Curtis, also a Fellow of the Linnean Society, are included. The sixteen illustrations and genealogical table add to the interest of a book which makes a valuable contribution to the history of the botany of the period, and its compilation could not have been in better hands than those of the Curator of the Curtis Museum at Alton.

"Reconstruction and the Land." By Sir Daniel Hall. 287 pp. (Macmillan & Co., London, 1941.) 12s. 6d.

This book begins with an analysis of the structure of British farming prior to the outbreak of war, which discusses such features as the size of holdings, the yield of crops and stock, the pecuniary returns, and the number and qualifications of the men concerned. The conclusion is reached that many of the troubles that have attended farming for the last fifty years have arisen from the predominating small size of British farms which does not allow them to take advantage of recent developments due to engineering and science. The latter part of the book deals with proposals for the reconstruction of the industry.

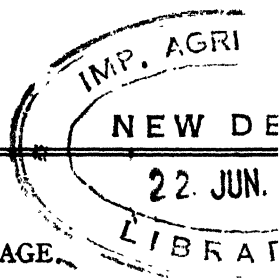
JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXVII



Part 4

April 1942



THE SECRETARY'S PAGE.

SUBSCRIPTIONS.

A REMINDER has been sent asking for the continued support of the Society, and the result, while gratifying, may be still improved; the activities of the Society would thereby be ensured and the privileges maintained.

SHOWS.

Fellows and Associates will be pleased to hear that her Majesty the Queen graciously paid an informal visit to the Show on March 17.

The Annual General Meeting was held on February 17, and an account of the President's address will be found in the Proceedings.

The next Show will be held on Tuesday, April 14 (12 noon to 6 P.M.), and Wednesday, April 15 (10 A.M. to 5 P.M.); the R.H.S. Daffodil Show will be held at the same time, also the exhibition of the British Carnation Society and Sewell Medal Competition.

In May a Show will be held on Tuesday and Wednesday, May 19 and 20.

DEMONSTRATIONS AT WISLEY.

The programme of demonstrations at Wisley for the year is the same as before. The next demonstration will be held in the Vegetable Garden on May 13 and 14, the subject being the Control of Vegetable Pests and Diseases. This will be followed on May 27 and 28 by a demonstration on Thinning, Transplanting and Successional Cropping, also to be held in the Vegetable Garden. Fellows desiring to attend these demonstrations should notify the Director of the Gardens.

LEEK SEED.

The supply of Leek seed will be short next year. It is, therefore, strongly recommended that owners of private gardens should save their own seed. Old surplus Leeks will be discarded this month; if, instead of throwing them away, they are replanted in a corner of the garden, they will produce seed which can be ripened in a greenhouse during October.

RED CROSS POSTAL AUCTION SALE.

As will have been gathered from the Catalogue, the closing date for the receipt of bids for the Red Cross Postal Auction Sale was March 31. The Organizing Committee desires to thank all those who made bids and to say that those who have been successful in making purchases will be notified by post as quickly as possible. The Committee would be grateful if those who sent bids will refrain from making inquiries, as correspondence will naturally impede the work and cause unnecessary expense.

DAFFODIL SHOW.

The annual Daffodil Show will be held in conjunction with the Society's Monthly Show on Tuesday and Wednesday, April 14 and 15. The schedule may be had on application to the Secretary, by whom completed forms for competitive entries must be received not later than by the first post on Friday, April 10.

SEEDS FOR PRISONERS OF WAR.

Fellows will be glad to learn that, through the generosity of the leading seedsmen, the Society has been able to send parcels of vegetable and flower seeds to all the Prisoner of War camps. The parcels are sent, under Red Cross labels, addressed to the Camp Leaders, who are in a position to see that the seeds are used in the best interests of the prisoners as a whole. It is hoped that the scheme will do something to improve the prisoners' diet and brighten their surroundings. The Trade has supplied what are believed to be ample quantities of seeds for all the camps, and it does not appear to be either necessary or desirable that parcels of any of the ordinary vegetables or common annuals or biennials should be sent to individual prisoners. The Secretary will be grateful for any scraps of information about the horticultural facilities available at the camps which Fellows may gather from prisoners' letters.

WISLEY IN APRIL.

WHILE it is scarcely to be expected that the severe winter through which we have passed will fail to leave its mark upon some of the less hardy spring-flowering shrubs, Wisley is fortunate in the possession of large and varied collections of plants whose proven hardiness is a security against the most rigorous winter. During the month of April such plants provide fresh delights in every part of the Gardens. Outstanding features this month will be the earlier Japanese Cherries, Forsythias and other shrubs in Seven Acres and the Award of Merit Garden, Saxifrages, Primulas and other occupants of the Alpine house, and Daffodils in many parts of the Gardens.

A tour of the Gardens may conveniently begin with an inspection of the collections on the north slopes of Battleston Hill. Some of the earlier Rhododendrons, such as *R. Thomsonii*, *R. irroratum*, *R. canadense* and *R. arboreum*, flowering now, are the forerunners of what promises to be an abundant display. Young plants of varieties of *Camellia japonica* are making good growth here, and at the time of writing are well furnished with flower-buds. The Spruces and other Conifers planted on the hill a few years ago are well established and are making vigorous, shapely specimens. Here also will be found the Trial collection of Daffodils, recently removed from Seven Acres, where they had become overshadowed by the growth of shrubs which formerly provided useful shelter.

In the Alpine house the visitor may expect to find a very colourful display. Saxifrages will be prominent, particularly those of the Kabschia section, including the citron-yellow *S. Boydii* and *S. Borisii*, the white *S. Rocheliana* and *S. Sündermannii*, and some delightful hybrids in shades of pink and rose. Primulas, too, are well represented. The clear lavender hue of the best forms of *P. marginata* is conspicuous; there will also be *P. Allionii* with mauve or white flowers nestling among their neat, green rosettes, and *P. Dubernardiana*, crinkly-leaved with (in the best forms) cheerful pink, Primrose-like flowers. Of the smaller Narcissi, *N. minor*, *N. calcicola*, *N. rupicola* and *N. Watieri* are attractive pot-plants, and other bulbs to be found here are the pale-flowered *Chionodoxa nana*, *Muscari Heldreichii* and several Fritillarias. *Shortia uniflora* var. *grandiflora* is at the height of its beauty, surrounded by many another choice species such as *Plagiorhegma* (*Jeffersonia*) *dubium*, *Armeria caespitosa*, *Phyllodoce coerulea* and *Lewisia Tweedyi*. In the beds and frames near the Alpine house there is usually something of interest to be found. During the present month the Tulip species will be much in evidence; *T. Kaufmanniana* in a variety of colours, *T. praestans* with its distinctive fire-red petals and grey-green, downy foliage, the pink, yellow-centred *T. saxatilis* and the tall, nodding *T. sylvestris* are a few of the earlier ones. *Fritillaria glauco-viridis* and allied species with quaint, bronzy-yellow flowers are overtopped by *F. libanotica*, a slender species with lovely grey leaves

and long spires of bloomy, plum-purple flowers. Some early-flowering Irises of the Juno and Oncocyclus sections may also be seen here.

The number of flowers in the Rock Garden and Alpine meadow is rapidly increasing day by day. *Rhododendron racemosum*, grouped beneath the pink weeping Cherry, *Prunus subhirtella* var. *pendula*, forms a pretty picture, only rivalled by the drifts of *Narcissus Bulbocodium* set off by groups of dwarf Rhododendrons such as *R. impectum* and *R. intricatum* in purple and lavender. In the moister parts of the Alpine meadow almost leafless clumps of *Primula rosea* will be pushing up a succession of flowers, elsewhere *Anemone Pulsatilla* opens its silken buds. In the Bog Garden *Lysichitum americanum* thrusts up its fleshy, golden spathes, almost concealing the more elegant white *L. camtschaticense*, while the livid, malodorous hoods of their poor relation the Skunk Cabbage (*Symplocarpus foetidus*) are already withering.

Flowering shrubs are now beginning to give a good account of themselves in all parts of the Gardens. In the Wild Garden the neat evergreen *Pieris floribunda* and its fine variety *elongata* with long white sprays, *P. japonica* and *P. taiwanensis* all deserve mention. Here also the early Rhododendrons, including the grey-leaved, rosy-lilac *R. oreotrephes*, *R. oreodoxa* with waxy, carmine bells, and rose-pink *R. Fargesii*, are seen to advantage in sheltered corners. The mossy beds in which they grow support a very mixed population of small herbaceous plants, among which Erythroniums, Scillas, Chionodoxas, Primulas and Wood Anemones in white, rose and amethyst are noticeable. A close search in the more shady places reveals the mouse-like flowers of *Arisarum proboscideum*.

Towards the end of the month Seven Acres will be bright with the Japanese Cherries, *Prunus yedoensis*, *P. Sargentii*, *P. subhirtella* and the first *serrulata* varieties such as the double white 'Shirotae.' *Magnolia Kobus* and varieties of *M. Soulangeana*, *Forsythia intermedia* var. *spectabilis* and *Pyrus salicifolia* assist to form a colourful picture, of which the most lovely feature is the group of Weeping Willows by the pond in their fresh, yellow-green foliage.

Regular visitors to Wisley will observe that some rearrangement of the shrubs in the Temperate house has been made to permit their unrestricted development. Among the plants of interest during April are *Agapetes macrantha*, a climbing shrub from Moulmein with large, waxy, flask-shaped flowers, the related *Pentapterygium serpens*, its long branches hung with rows of scarlet bells, *Rhododendron bullatum* bearing large, scented white flowers, and the equally fine blush-pink *R. ciliicalyx*. The bold flowers of *Strelitzia Reginae* present a vivid contrast of blue and orange, and no less bright are the clusters of *Imantophyllum miniatum*. *Iris japonica* grows to perfection here, producing a long succession of dainty flowers.

Finally, the Half Hardy house is worth a visit to see, among other things, *Metrosideros diffusa*, bearing masses of crimson flowers, *Paeonia Clusii*, with globular white flowers, and *Vallea stipularis*, an uncommon tender shrub from South America.

THE WAR-TIME VEGETABLE GARDEN.

APRIL.

The Water Supply.—The food which a plant obtains from the soil can only be absorbed in the form of a solution in water ; therefore in very dry weather the food supply may be so much reduced that the plant ceases to grow freely. Water in the soil is not stationary ; it is not held, as in a vessel, loose in a cavity, but as a thin film round each soil particle ; the thickness of this film tends to adjust itself so that when it is thinned down by evaporation near the surface of the soil, water moves in that direction to replace that which has been lost. If this process can be checked, moisture can be conserved, and a fine surface soil does very effectively check evaporation.

Constant *hoeing* has for its chief purpose the maintenance of the top layer of soil in a fine friable condition. On most allotments and in many gardens it is not possible to water large areas, and the chief implement for conserving moisture is the hoe. All the ground should be moved every week or ten days during the growing season, the work being performed with a Dutch or push hoe ; it is neither necessary nor desirable to work the soil at all deeply or the surface layers will be dried out too completely ; the depth to aim at is about half an inch ; the hoe should certainly not go deeper than one inch. On heavy or stony ground it may be necessary first to prick the soil lightly with a fork to facilitate the work of the hoe. Perhaps the most valuable result of hoeing is the removal of weeds ; weeds are also plants which draw their water supply from the soil, and their competition should be removed so that the crops get all the supplies available. Regular hoeing should start early before the soil begins to dry out.

Mulching is another method of checking evaporation ; the best material is strawy farmyard manure, but this is difficult to obtain ; other suitable substances are well-decayed vegetable refuse, leaf-mould, hop manure, lawn cuttings or even rough grass provided it does not contain weeds whose seeds will be a nuisance later on. But it is no use putting the mulch on soil that is already dust dry or has a hard surface ; it should be spread after hoeing round such plants as Runner Beans, Peas, Cabbages and Tomatos, which will benefit from the extra food material contained in the mulch as well as from the moisture conserved.

It must be realized that both hoeing and mulching help to conserve the water present in the soil but they do not add to the amount. Where a supply is available *watering* is very useful, especially in prolonged dry weather ; but if it is done at all it must be done thoroughly ; better a thorough soaking once a week than daily dribblets ; the aim when water is given should be to get it well down several inches into the soil, not merely to damp the surface, which will quickly dry out again. If the top inch only is kept moist, roots are attracted to it and only a

small body of the soil available is used by them ; also, if this layer is not kept damp but eventually allowed to dry out the plants will suffer very seriously. It is no good pouring water on a soil so dry that a crust has been formed, most of it will merely run off ; the crust must first be broken with the hoe, which for vegetable gardening in general is a better implement than the watering can or hose.

Difficulty may be experienced in sowing seeds when the ground is very dry ; overhead watering makes the soil too compact and it is much more satisfactory to get enough moisture into the ground before sowing to last till-germination has taken place. To do this a deep drill should be taken out (as though Potatos were to be planted) ; this is filled with water and after it has soaked in the soil that was removed is returned to the drill, the surface raked over and a shallow drill of suitable depth for the seeds to be sown is taken out over the damp earth.

Watering plants overhead so that the leaves are wetted may be refreshing on a warm evening but very chilling if the temperature is low, or if there is much wind.

There are occasions when water is required by other parts of the plant besides the roots ; thus in very dry weather the stigmas of the flower, normally sticky, may be so dry that the pollen fails to adhere, the flowers are not pollinated and fruit does not form ; hence the direction to spray Runner Beans in the evening if they are not setting well. Tomatos under glass may want similar assistance ; they should be grown in a dry atmosphere, for if the leaves are too moist fungus diseases may appear, but a light spraying—as distinct from a heavy syringing—will help the formation of fruit.

Work to be done.—The last sowing of Summer Spinach should be made early in the month, and Spinach Beet sown for use in the hotter weather. Early Beets and early Carrots for summer pulling may go in now, also further sowings of Kohl Rabi and Lettuce. About the middle or third week of the month Brussels Sprouts for late supplies and Sprouting Broccoli and Savoys for winter use should be sown. Onions for pickling are sown this month ; successional sowings of Onions for salads made ; and seedling Onions raised under glass transplanted to their permanent quarters in suitable weather ; do not plant them too deeply and, unless exhibition size Onions are required, four inches between each will give sufficient space. Peas (second early and maincrop) and Turnips should also be sown this month. The mid-season and maincrop Potatos can be planted now. Seedlings already germinated should be thinned, Pea sticks or other form of support prepared for Peas, and trenches got ready for Celery. The soil between the rows should be hoed at least every ten days.

Frames.—Peas raised under glass can be planted out in suitable weather and Cucumbers and Marrows sown if the frames can be protected from frost. Harden off Cabbages, Cauliflowers, Onions, etc.

Greenhouse.—Celery for late supplies can still be sown and Vegetable Marrows put in. Seed of Tomatos to be grown out of doors should be sown in the first week ; plants raised in February for growing under

glass should be potted on as soon as they need it; they will need supporting and continual attention to the removal of side shoots. French Beans can be sown provided the temperature does not fall below 55–60° F.

Crops available from the Garden in April.—Kale, Leeks, Radishes, Spring Cabbages, Sprouting Broccoli, Turnip Tops.

From Store.—Beets, Carrots, Haricot Beans, Onions, Swedes, Turnips. Apples and Pears.

The Fruit Garden.—The pruning of fruit trees which were planted during the past winter should be completed as soon as possible. Shorten the leading shoots by one-half instead of the normal one-third on established trees. It is better to prune the same season as planting rather than leave the first pruning until the following winter. Finish the tying-in of wall-trained trees, renewing where necessary frayed or worn ties. Give all wall-trained trees a good mulch of farmyard manure or some other material which will serve to retain soil moisture. The established Strawberry bed will also benefit from a mulch so as to keep the surface roots cool and moist. Other fruits which should be mulched are Raspberries, Gooseberries, Loganberries, Black and Red Currants. Mulching serves little purpose if the soil is dry when it is applied, as the manure would absorb most of any subsequent rain and little would penetrate to the roots. So apply the mulch this month while the soil is reasonably moist.

Spray Black Currants with lime sulphur at 1 in 30 in order to prevent Big Bud Mite. Add a suitable spreader to the wash. The time to spray is when the unfolding leaves have reached the size of a shilling, and before the flowers have started to open. Where American Gooseberry Mildew is troublesome spray the Gooseberry bushes with a wash consisting of 1½ lb. washing soda and 1 lb. of soft soap (if available), dissolved in 10 gallons of water. The first application is given just before the flowers open and repeated immediately after flowering, and at fortnightly intervals if further sprayings are necessary. If soft soap cannot be obtained, spray with ammonium polysulphide. Start to control Apple and Pear Scab by spraying the trees, when the flower-buds can just be discerned, with lime sulphur at 1 in 40; repeat with the same wash at 1 in 60 when the colour of the flower-buds shows, but before the petals have started to expand. Another spraying is necessary to complete the control, but that will be dealt with next month. The Apples 'Stirling Castle,' 'St. Cecilia,' 'Lane's Prince Albert' and 'Newton Wonder' are sulphur-shy, that is, are damaged by lime sulphur, and these varieties should be sprayed with Bordeaux Mixture. Colonies of Woolly Aphis found on Apple trees should be destroyed by painting with methylated spirit, using a stiff paint brush for the work.

Push ahead with any grafting to be done before there is too strong a flow of sap. Quite often a solitary Plum or Pear tree flowers but fails to fruit. The usual cause of this is that the variety is self-sterile—that is, will not set fruit with its own pollen and requires to be pollinated with pollen from another variety before fruit will set. The remedy is to plant another variety of the same kind of fruit, which flowers

about the same time as the existing variety. This takes time, and, temporarily to overcome the difficulty, obtain some flowers of another variety, suspend in a jar containing water amongst the branches, so that bees will transfer pollen from one variety to the other.

A NEW *NARCISSUS CYCLAMINEUS* HYBRID.

AN interesting addition to the all too few *cyclamineus* hybrids is the seedling shown under number 536/63, since named 'Kitty,' which was placed first in Class 30 (open class for a single bloom, Division VI) at the 1941 Daffodil Show and which had the added distinction of beating the hitherto unconquered 'Pepys.'

The illustration (Fig. 40) shows part of the seedling bed with three seedlings of the family that flowered in 1940 at four years from seed; the flower facing towards the right is characteristic of the subject of this note.

Raised and shown by Mr. C. F. COLEMAN, Cranbrook, Kent, it was bred from the Leedsii 'Mitylene' with pollen from *N. cyclamineus* (in this case a collected Portuguese wild form), a combination which does not appear to have been tried before.

The colour is white (on opening the cup is a very pale lemon which turns white within a day or so) and by reason of its short neck it is beautifully poised on the 10-12-inch stem. The cup is cylindrical in shape, with shallow serrations in the edge of the very slightly recurved lip, and is about half the length of the broad pointed perianth segments which curve back from its base in the form of a miniature ballet skirt. It is more tolerant of cultivated conditions than *N. cyclamineus* and has the correct size and proportions that are called for on the Rock Garden.

Many of the family have the deep golden colour of *cyclamineus*, and one or two are bicolours, but most of them are white. Though at first this may seem strange, an analysis of the pedigree shows that there is much *poeticus* and white 'Ajax' influence behind them. 'Mitylene' is a seedling from 'Beacon' by pollen from one of ENGLEHEART'S white Leedsii, and 'Beacon' is reported to be from 'Princess Mary' by pollen of a *poeticus recurvus* seedling of ENGLEHEART'S; the breeding of 'Princess Mary' is not known but a *poeticus* was obviously one parent. ENGLEHEART'S Leedsii originated by crossing *N. poeticus ornatus* both ways with many of the early white trumpets, such as *N. cernuus*, *moschatus* (Dutch) and some of the old garden varieties, chiefly those which had been found in Irish gardens. The vigour of his modern Leedsii can be traced to the use by him of 'Mme. de Graaff' in succeeding generations, and much of this vigour has been inherited by these *cyclamineus* hybrids.

DAVID DOUGLAS.

By F. R. S. BALFOUR, M.A., F.L.S., V.M.H.

It is to three Scottish explorers of the North-west Pacific Coast of America that we owe the botanical discoveries and introductions from that region, most of them very familiar now in our woods, shrubberies and gardens as the climate of their native habitat so nearly resembles our own.

The first was ARCHIBALD MENZIES, surgeon on board VANCOUVER'S little ship *Discovery* which, in May 1792, anchored in the Sound which he named Puget after his first lieutenant. The laborious exploration in boats of that great and intricate inlet was followed by his hazardously taking his ship round what had been thought to be part of the mainland of New Caledonia and which he thus proved to be an island and which bears his name. MENZIES described the plants he gathered and his herbarium must certainly have been seen by the next botanical explorer, DAVID DOUGLAS, who spent two years in the Columbia River country, landing on the coast thirty-two years later than MENZIES. The last was JOHN JEFFREY, also a Perthshire man, whose botanical work in Western America was from 1851 till he disappeared in San Francisco early in 1854.

DAVID DOUGLAS was born at Scone, near Perth, in 1799. He was the second son of a stone mason ; the family consisted of three sons, John, David and George, and three daughters. He early showed a fondness for natural history beyond that of the ordinary country boy. HOOKER told a pleasant story of his spending his few pennies to buy liver for his owlets. He had a daily walk of six miles to and from school at Kinnoull. He began work in the nursery ground attached to Lord MANSFIELD'S garden at the tender age of 10 or 11, when he became apprenticed. In 1818 DOUGLAS went into the service of Sir ROBERT PRESTON of Valleyfield on the Forth. The head gardener was sympathetic, and DOUGLAS was lucky in getting access to the laird's excellent botanical library ; he took very profitable advantage of the privilege. After two years he applied successfully to be taken on to the staff of the Botanic Garden at Glasgow. Dr. WILLIAM J. HOOKER, the Professor, took a great liking for young DOUGLAS who, on occasion, accompanied him on botanical trips to the Western Highlands and Islands while HOOKER was engaged on his *Flora Scotica*. STEWART MURRAY was the curator of the Garden ; it was on the recommendation of these two men to Mr. JOSEPH SABINE, the honorary secretary of the Horticultural Society (not yet Royal), that DOUGLAS was employed in 1823 as explorer for the Society in quest of seeds and herbarium material of plants at that time unknown to cultivation. DOUGLAS kept up a correspondence with Dr. HOOKER to the end of his life, indeed his last letter, written on May 6, 1834, two months before his tragic death in Hawaii, was addressed to HOOKER.

The first expedition was to the Eastern United States. He sailed from Liverpool in May 1823 and returned about six months later. He made a special study of the many Oaks of the country and in a letter to SABINE enumerates nineteen species. Herbarium specimens of these were brought home by him but apparently no acorns were forthcoming. MICHAUX had done much original work on American Oaks a few years earlier and DOUGLAS was familiar with his writings.* It is unfortunate that so few Oaks of Eastern America thrive in our own country. To his list of them DOUGLAS later added *Quercus Garryana*, the only Oak of the North-west. He had named it after the Deputy Governor of the Hudson's Bay Company. The daily diary DOUGLAS kept of this first visit to America is by no means the least interesting part of his Journal. The Journal was published in full by the R.H.S. in 1914. It had lain neglected in their cellars since DOUGLAS's death in 1834. This unconscionable delay is hard to understand, as indeed were two of the excuses offered by the editors. It was urged that the writing was difficult and that the ink was faded.

The book might have been a fuller life of DOUGLAS had it contained DOUGLAS's letters to Dr. HOOKER, all easily available in the Kew Library. Dr. HOOKER in his *Companion to the Botanical Magazine* in 1836 wrote an excellent biography of DOUGLAS and also published the Journal of his explorations of the North-west from 1825 to 1827. The Journal of this, his second trip to America, comprises 216 pages of the R.H.S. publication. Here I must speak of the curious fact that the daily diary as published by Dr. HOOKER and by the R.H.S. are different in many particulars. They deal with the same events but the language and spelling of names vary and, strangely, each contains interesting matter omitted from the other; indeed they are often supplementary to each other. The originals of both Journals were in DOUGLAS's own hand. It seems to me probable that the one published by HOOKER must be a revision made by DOUGLAS after his return home and was possibly to be the foundation of a book of his travels which JOHN MURRAY had invited him with "a handsome offer" to write after his return in 1827. He began preparing this for the press but it was never completed. On the other hand the Journal published by the R.H.S. was probably for the main part as sent home by DOUGLAS, together with his seeds and specimens. These he despatched from the Columbia River whenever a ship sailed for home. Also, from time to time, he sent seed and papers across the continent in charge of Hudson's Bay Company men. It is possible, however, that the Journal as published by HOOKER, which omits the long lists of plant discoveries, may have been brought home across the continent by DOUGLAS himself in 1827. That Douglas made copies of his Journals is certain. He writes on June 9, 1826, to J. SABINE, from the junction of the Lewis and Clark's River with the Columbia, when he was forwarding his collections to the coast for shipment home, "having

* Many Oaks grown from acorns of MICHAUX' collecting could be seen as fine trees up to recent years at the Château de Geneste in the Medoc.

so much to do, it is entirely out of my power to send at this time a copy of my journal, a circumstance I regret exceedingly."

The R.H.S. published as an Appendix to the Journal a document that had been in their hands since DOUGLAS's death. It is in DOUGLAS's handwriting and is entitled "Some American Pines." It doubtless was written between his return in 1827 and departure in 1829. It enumerates seventeen species of Conifers and devotes the longest description to the Douglas fir. All the localities where he had seen the tree are given. As in the Journal, Fir, Spruce and Larch are all called *Pinus*, and the names of eastern species are frequently attributed to western trees and never corrected in the Editor's notes.

DOUGLAS eagerly accepted the Society's invitation to sail for the North Pacific Coast in 1824. His Glasgow friend, Dr. SCOULER, was surgeon on the ship *William and Ann*, of 161 tons, and the two men had the same interests and were filled with the same spirit of adventure. They sailed from Gravesend on July 26, 1824. The voyage round Cape Horn to the Columbia took eight months and fourteen days. On the way they spent interesting days at Madeira, Rio de Janeiro, Juan Fernandez and the Galapagos Islands. DOUGLAS had a good knowledge of animals and birds and sent home collections of his skins whenever opportunity offered.

Before he sailed it may be taken as certain that DOUGLAS had made a close study of VANCOUVER's Voyage, of which a second edition in six volumes had been published in 1801. He had seen ARCHIBALD MENZIES' plants, collected on his voyage in the *Discovery*, and he also seems to have been familiar with PURSH's descriptions of the plants in the small collection of 150 specimens from the North-west which Pursh had received in 1806 from MERIWETHER LEWIS of the famous LEWIS and CLARK transcontinental journey; they had reached the Pacific overland by way of the Columbia River. DOUGLAS was thus well prepared for the first sight of the great trees, delightful shrubs and lowlier plants which he met on his way up the Columbia to Fort Vancouver, which is 90 miles from the mouth. It was a Hudson's Bay trading post and it lies on the north side of the river, nearly opposite to where the great Willamette River, in DOUGLAS's days called the Multnomah, flowing from the south empties its waters into the Columbia. The modern city of Portland is close to the point of junction. Fort Vancouver was the farthest point reached by ocean-going vessels and was where Captain VANCOUVER's officers had completed their survey of the Columbia thirty-three years before DOUGLAS's arrival.

In those days the coast of California between the latitudes of 34° and 46°, that is from the present Los Angeles to the Columbia River, was still known by DRAKE's name of New Albion. From the Columbia northwards, embracing Vancouver Island, between the latitudes of 46° and 51° the coast was called New Georgia. The country westwards from the Rockies was known as Columbia and the only settlements of white men in it were Hudson's Bay Company posts. The

interior of the northern part of this country was New Caledonia. The name survived till Queen Victoria in 1858 called it British Columbia. This was done at the request of the French, who wished to avoid confusion with their island in the South Pacific of that name.

DOUGLAS used Fort Vancouver as his base for two years and received much help and kindness from the Hudson's Bay Company officers. Two of those most often mentioned by him were Mr. A. R. McLEOD, who accompanied him in his trip up the Multnomah in 1826, and Dr. JOHN McLOUGHLIN, chief factor for the company, whose name occurs throughout the Journal with constant appreciation. His letters of 1825-38 appear in the most recent publication of the Hudson's Bay Record Society.

Even before he left the ship DOUGLAS saw the great Fir to which his name was afterwards given by LAMBERT, as well as the Western Hemlock, which he did not recognize as a different species from that of the east: it was therefore left to be introduced by JEFFREY. Of his first list of plants, *Gaultheria Shallon* was No. 3. Of it, he says, "the natives call it Salal not Shallon as PURSH has stated, it was the first plant I took in my hands; so pleased was I that I could scarce see anything but it"; there speaks the true plant enthusiast. In the first few days he found and recognized the noblest broad-leaved evergreen of the whole Pacific coast, *Arbutus Menziesii*.

In the Journal he frequently gives names of eastern American species to trees of the west. He did not realize, nor indeed did the R.H.S. editors of his Journal, eighty-nine years later, that not a single Conifer, and hardly one tree or shrub of any genus, is common to both sides of the continent. To DOUGLAS, as was the custom till well after his time, all Conifers were *Pinus*. MENZIES' Diary spoke of the "pinery" that clothed the mountains. The fashion survives with us in the word "pinetum."

In the first month after landing, among many more plants he enumerates *Ribes sanguineum*, *Rubus spectabilis*, *Cornus Nuttallii*, *Vaccinium ovatum*, *Berberis Aquifolium* and the still more attractive *B. nervosa* which unaccountably had almost disappeared till re-introduced in 1907, also *Acer macrophyllum*, *A. circinatum*, *Lupinus polyphyllus*, *Camassia esculenta*, or, as DOUGLAS calls it, *Phalangium Quamash*. He describes how roots of the last were roasted and eaten by Indians and white men alike. He gathered seed of all these later, and in September of that year he discovered on the same day and named the two great Firs, *Pinus nobilis* and *P. amabilis*. The latter was not seen again till SARGENT, PARRY and ENGELMAN rediscovered it in the autumn of 1880 on Silver Mountain on the Fraser River. SARGENT soon afterwards found it where DOUGLAS first saw it, at Grand Rapids on the Columbia. SARGENT wrote of DOUGLAS in his *Silva* that "no other collector has ever reaped such a harvest in America, or associated his name with so many useful plants."

After their arrival SCOULER accompanied DOUGLAS up the river to Fort Vancouver but was back on board by June 1, when the *William*

and Ann headed north for Queen Charlotte Island. The ship had returned to the Columbia by the autumn and sailed for home at the end of September. DOUGLAS and SCOUER sat up the whole night to tell each other of their adventures. SCOUER took home a great consignment of DOUGLAS's seeds, dried plants, skins of birds and quadrupeds and, also, no doubt the first instalment of the Journal. SCOUER published an interesting account, in three parts, of his voyage outwards and up to the time of his sailing for home from the Columbia River, which appeared in Vols. 5 and 6 of the *Edinburgh Journal of Science*, 1826 and 1827. He had much to tell of the burial customs of the Indians of the Columbia River, and of the plants he saw in the Northern Islands. His descriptions are vivid and the language is spritely. One of the best letters from DOUGLAS was written to SCOUER from Priest Rapid on the Columbia and was dated April 3, 1826. In it he described the Sugar Pine which he had named after A. B. LAMBERT, and which he evidently regarded as his greatest discovery. It is to be regretted that there are so few trees of it in Great Britain to-day. There are growing in the valley of the Tay close to DOUGLAS's home the finest specimens in Europe of Douglas Fir, Sitka Spruce, Thuya and the great Firs which DOUGLAS named and introduced, but alas! the Sugar Pine has disappeared from Scotland. DOUGLAS named it as early as August 1825 from seeds Indians had brought him, but it was not till the following autumn, far to the south, in a hazardous and laborious trip to the Umptqua River, a tributary of the Multnomah, that he saw the tree himself.

His first consignment of seeds and specimens numbered 499, and these, with letters to Messrs. HOOKER, SABINE, MURRAY, ARCHIBALD MENZIES and his brother JOHN, went home with SCOUER in the *William and Ann*. He made long expeditions up the Columbia to the Hudson's Bay Company's posts of Walla Walla and to Fort Colville at Kettle Falls, 90 miles above the junction of the Spokane River with the Columbia and about 30 miles south of the present Canadian and U.S. boundary. It was there that on April 26, 1826, he found the greatest of all Larches, *Larix occidentalis*, which he mistook for the eastern species, *Larix laricina*. He says, "I measured some 30 ft. in girth and those blown down were 144 ft. long." He never got seed. Thirty years ago successful efforts were made to collect seed but, like *Pinus Lambertiana*, it has proved a failure with us.

On October 26, 1826, he at last found *Pinus Lambertiana*. He measured one "57 ft. 9 ins. in girth at 3 ft., 17 ft. 5 ins. at 134 ft. and of a length of 215 ft." He writes to SCOUER—by that time home again—"what would Dr. HOOKER do to dine under its shade, Mr. LAMBERT could not eat anything if he saw it." Indeed this tree exceeded any I myself found when, after seeing thousands, I photographed a smaller specimen which appeared in ELWES and HENRY's great book. During this expedition on the Umptqua River he found *Castanopsis chrysophylla* and *Umbellularia californica*, of which he ate the nuts roasted. Forty miles further south, on the Oregon-California boundary, where

I found in 1907 the rare *Picea Breweriana*, I saw many great trees in the valleys of those two fine evergreen species.

The R.H.S. in their archives have a thick bundle of sheets in DOUGLAS's writing: on each he describes a plant of his collecting. They have never been published, and I have selected two examples of especial interest. His description of *Thuja plicata* is noteworthy as he seldom mentions this tree in his Journal, yet it is the equal in size of any Conifer on the North-west coast. He sometimes confounded it with *Thuja occidentalis*, a smaller tree of eastern America. *Taxus 'baccata'* of DOUGLAS is *T. brevifolia* of NUTTALL, a species almost indistinguishable from our native Yew. He mentions elsewhere that the Indians made their bows from it. *Castanopsis chrysophylla*, despite DOUGLAS's hopes for it, is still a rare tree with us and seldom bears fertile fruit. Though discovered by DOUGLAS, seeds did not reach this country till 1845.

"*Thuja plicata*.—Common on the mountains of North California in the 43° latitude, and forms a considerable part of the forests on the Columbia from the confluence of that stream to its source as well as the mountainous districts on the north as far as the 52° latitude. This is a rapid growing and very graceful tree, in magnitude far exceeding any other species; affecting thin soils on hilly rocky places overhanging mountain torrents, rivers or rocky bays of the sea coast. Their form is more compact, equally straight and of greater dimension than *Thuja occidentalis*, frequently exceeding a hundred and sixty feet in height and thirty-six feet in circumference six feet above the ground.

"The wood is very light, smooth and fine, clean and regularly grained, of a brownish color and possessing a peculiar pleasant flavor. No tree on the North West Coast of America is held in so much repute by the aborigines of that country as the present. Their canoes which for magnitude and skillful workmanship can hardly be excelled are made of the timber of this tree, and from its great lightness, extreme durability and the facility with which it can be wrought, no minor recommendation to a people possessing such slender means of contributing to their comfort by building or otherwise, it is of all others the most desirable for almost every purpose to which it is applied. With wedges made of *Taxus baccata* or the wood of *Pyrus rivularis* and an oblong stone taken from the brook which serves as a mallet, trees six feet in diameter and twenty feet long are split into boards about two inches thick with as much exactness and much quicker than if cut by saws. These boards serve for constructing the walls and roofs of their lodges. In May and early in June during the flow of the sap the bark is carefully risen by the help of wooden wedges from the trunk in pieces generally about 6 feet long keeping the whole circumference of the trunk entire and laid flat and in order that it may the more readily retain that position thin skewers of seasoned wood are run through the inside bark. This is greatly used as roofing, perfectly impervious to water and will continue in a good state of preservation for the space of ten or twelve years. By gently beating the inner bark

with a sharp bit of wood holding it over the edge of a puddle and then rubbing it between the hands, a tissue is made which is afterwards twisted or plaited into small cords or, as is sometimes the case, left simply in a plain state, females make their petticoats or sorts of cloaks. Mats for covering their persons during rain are also made of the same material, as also are stronger ones for the purpose of affording temporary shelter as huts when travelling. The wood makes good shingles—the Hudson's Bay Company establishments are covered with it.

"*Castanea chrysophylla*.—Flowers in May. Fruit ripe in September. Leaves alternate, stalked lanceolate and acuminate, perfectly entire, shining green above, golden yellow underneath, veiny and coriaceous. Male flowers numerous in long erect spikes. Female flower unknown. Prickles of the fruit stellate, long, rigid and very sharp, seeds 3 obtuse small—very pleasant to the taste.

"This princely tree occupies mountainous parts of Northern California from 46° southwards and by its rich varied verdure, eminently contributes to enliven the scenery, a relief as it were to the mind from the dull glossy but magnificently grand and imposing scenery of the pine tribe that decorate the higher latitudes of the north. Its most northern range is the summit of the mountains at the Grand Rapids of the Columbia, in latitude 45° 41' 52", 122° W. longitude at an elevation of five thousand feet above the level of the sea, in decayed vegetable soils, on a rocky bottom, but here it is only a mere shrub of loose and depressed habit four or five feet high and bears no fruit. Further to the south on the same range of mountains which run nearly parallel with the coast it gradually becomes more abundant and continues to increase in magnitude till the 48° where in an extensive tract between the Multnomah and Aquilars or Umptqua River the soil and climate apparently become more congenial to its nature it no longer remains a straggly pygmy shrub but rises to a graceful tree sixty to an hundred feet high, and from two to five feet in diameter, elegantly straight and densely clothed with branches to the ground, more especially solitary ones whose branches spread alike on all sides so thick and shadowy that they afford favorite retreat to the deer tribe during the intense heat of summer as also for bears who go in pursuit of the deer in the autumnal months for the purpose of finding the nuts which they appear to prefer to acorns or to even the berries of *Arbutus*. Such trees in groves of Oak or on the outskirts of pine woods or on the high mountains where they attain their greatest size, during a gentle breeze of wind sufficiently enough to produce a rustling among the leaves, add a golden lustre to the scene which is inexpressibly contrasted with the sable dress of the lordly pines by which they are surrounded. The bark is very smooth light grey in the aged trees, greenish in the younger ones and the young twigs of the same colour as the inside of the leaf. The wood is exceedingly close grained, very fine, hard, heavy and takes a beautiful polish of a brown or tawny colour, and judging from these facts, is doubtless immensely durable. The fruit is delicious and abundant and forests composed of this timber during the season of

fruit teem with *Ursus*, *Cervus* and *Columbae*. Of the latter I have killed several birds more than two hundred miles distant from the nearest point where they could obtain seed and have found in the crop abundance of fruit which I ate and found good. This fact led me first to the knowledge of this tree. The native tribes in the interior of California gather them as an article of winter food. How much beauty it would give to English *Sylva* can be well imagined and I close this notice of it with regret at being compelled to say it yet remains to be introduced."

He often met with danger from the Indians, some of the tribes being intermittently hostile to the whites, but the hardships he underwent from hunger, insects, fatigue and exposure were enough to daunt any man. He suffered severely from ophthalmia which had been caused by snow blindness in the summer of 1826; he eventually lost the sight of one eye from this cause. When he got back to Fort Vancouver after an arduous expedition on August 31, 1826, his own graphic words were that he was "in poor plight, weary and travel-soiled, glad at heart, though possessing nothing but a shirt, leather trousers and an old hat, having lost my jacket, neck-kerchief and worn out my shoes; I made my way to the Fort having traversed 800 miles of the Columbia Valley in twelve days unattended by a single person except my Indian guides."

The place of his discovery of the Sugar Pine is likely to be permanently commemorated in Looking Glass Valley, 18 miles from the modern Roseburg, where it is proposed that an area of 2,000 acres of Sugar Pine Forest is to bear his name.

For Map, see Fig. 42.

(To be continued.)

Mr. A. G. LEE, of Chedworth, Chalfont St. Giles, demurs to a statement by Mr. M. B. CRANE (*R.H.S. JOURNAL*, 1941, p. 355) that triploid varieties of Apples are poor pollinators for other varieties. Mr. LEE quotes figures from Mr. CRANE's own experiments to show that crossing with the pollen of triploids often gave results as good as, if not better than, diploid crossed by diploid. Mr. CRANE replies that his experimental results with hand pollination, which ensure a greater application of pollen than would occur in the open, do confer an advantage on the triploids, since the pollen of the latter contains a smaller proportion of viable grains.—A. D. H.



FIG. 40 - NARCISSUS CYCLAMINEUS HYBRIDS.
The flower facing towards the right is characteristic of the hybrid
'Kitty.'
(See p 120.)



FIG. 41. WILLOW WHEAT IN SEVEN YEARS. WISLA, SEPT. 1941 AND APRIL 1942.

FIG. 41. WILLOW WHEAT IN SEVEN YEARS. WISLA, SEPT. 1941 AND APRIL 1942.

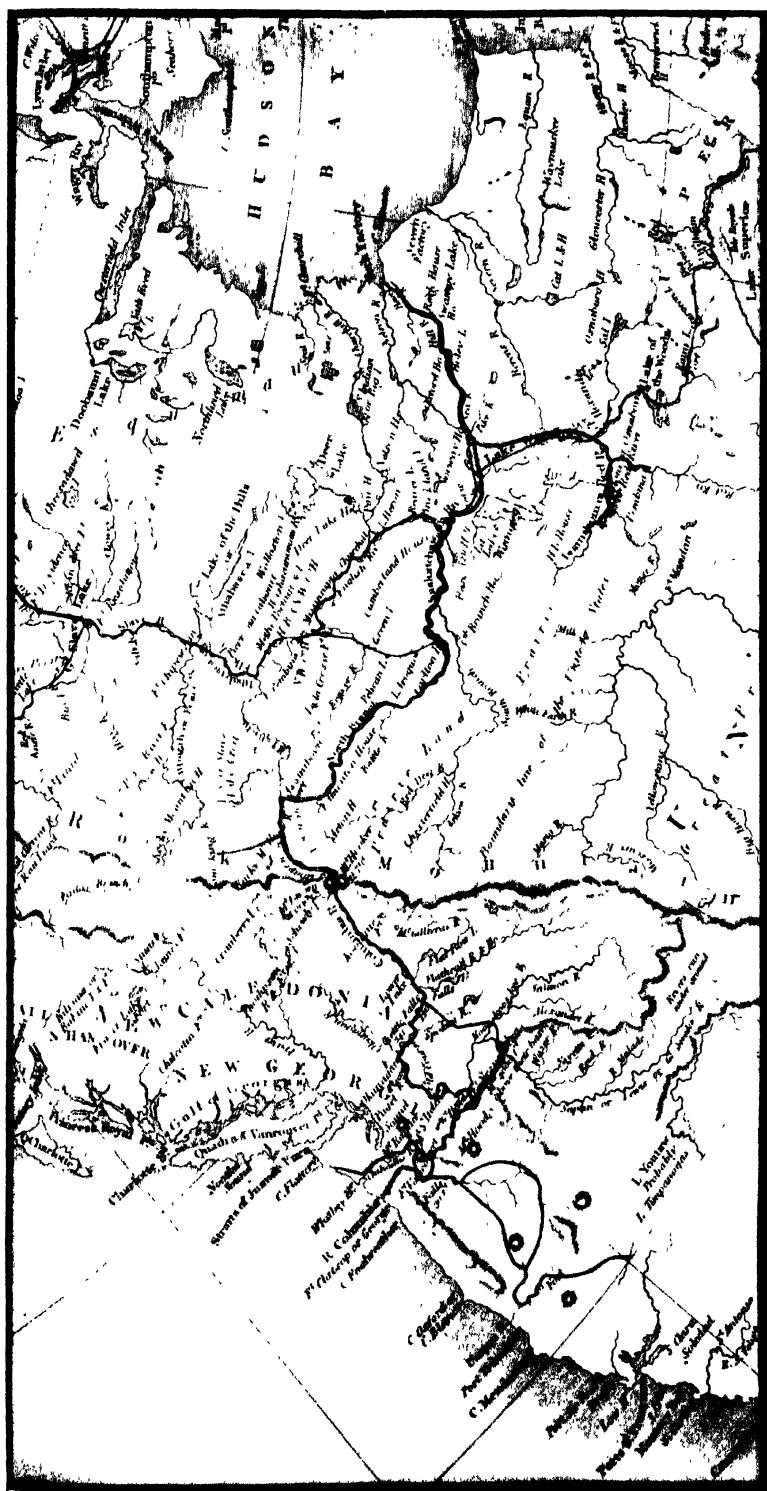


FIG. 42. FROM A MAP OF N.W. AMERICA IN DE W. J. HOOGERS' *Eloy Borda*, FIRST PART, 1829.
The thick line indicates D. Douglas's journey of 1825-27; the thin line that of Richardson's arctic journey
1828-30, 1831.



Photo: N. K. Gould.

FIG. 43 --BERBERIS HYBRIDS 'BARBAROSSA' (*right*), 'RUBROSINILIA' (*centre*), UNNAMED SEEDLING (*left*)

(See p. 132.)



Photo: F. C. Brown

FIG. 44 BERBERIS HYBRIDS. 'FIREFLY' (*top*), 'CARMINA' (*bottom*)
(see p. 132)

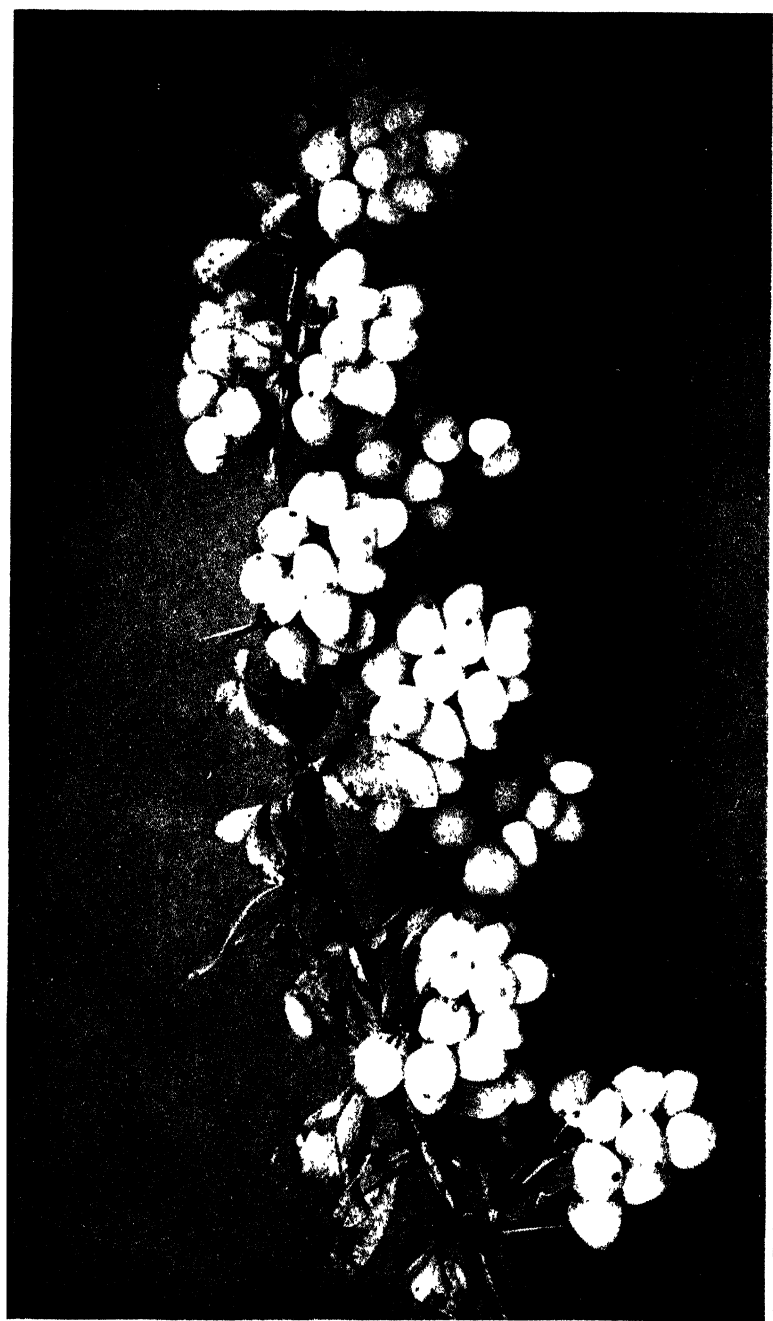


Photo F. C. Brown

FIG. 45. *Buddleja hybrid* 'Autumn Blau' (Sep. 1937)



FIG. 46. Hoof-Ranunculus. *Ranunculus abortivus*.
 Pale, almost white, spots which in some cases
 fall out and become 'shot-holes'.



FIG. 47. Mist Rust. *Pinus contorta* *Menthoe*.
 Affected stems are sometimes slightly swollen and
 distorted and show reddish-orange blisters
 which later become craters (cluster cups).
 (See p. 139.)

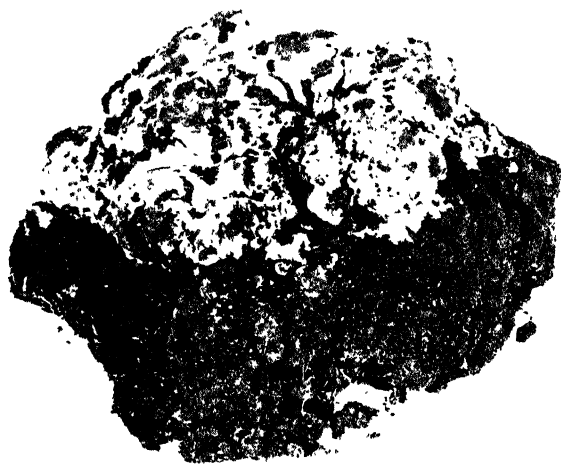


FIG. 48 - MUSHROOM WHITE MOULD (*Mycogona perniciosa*)
 Clumps of young Mushrooms are overgrown by the white mould
 and appear as white shapeless masses
 (See p. 137.)



FIG. 49 - MUSHROOM BED SCLEROTIUM (*Xylaria vaporaria*).
 The sclerotia are irregularly shaped black and branched structures.
 (See p. 138.)

AN ANALYSIS OF THE WISLEY HYBRID BERBERIS.

By THE REV. LESLIE W. A. AHRENDT, M.A., F.L.S.

It is the custom to provide garden hybrids with "fancy names" which demand no botanical description, and which, as a consequence, are never defined; this seems an illogical proceeding, for no name, however informal, has any value unless there is a precise definition of the object to which that name applies. It is the purpose of this paper to record, once for all, from observations made from the original plants, the salient features of those garden hybrid Barberries, which, noted for their autumn display of berry, are generally called the Wisley hybrids, because most, and the earliest of them, originated at Wisley.

Before referring directly to these, it is necessary that a preliminary analysis be presented of the species from which they are derived. These species belong, mostly, to what is called the section *Polyanthae*, a group possessing fairly small flowers (of diameter 6–8 mm.), and the small (4–8 mm.), soft, pink or pale red berries, crowned with a distinct style, which have been developed in the hybrid forms, and for which they are grown. Most of the members of this section have, as the name implies, an inflorescence containing many (12–100) flowers, and this is paniculate in form; here we may begin to discriminate by recognizing two smaller groups, according to the form of the panicle:—

Set 1, in which the panicles are elongated, measuring from 5–15 cm., and bearing from 40 to 100 (or more) flowers, these being so disposed that, although the pedicels are sometimes very short, the inflorescence as a whole is not very dense, but rather loose (as in *B. Koehneana* Schneider), or made up of several widely separated, though individually dense, branched portions (as in *B. Prattii* Schneider). This set has been called the subsection *Eupolyanthae*; it contains a number of species of which only the two just named are in cultivation in England to-day. *B. Koehneana* is very rarely to be found, and has not been responsible for any of the hybrid forms; but *B. Prattii* is very common, and is to be found both bearing its true name and also wrongly labelled as *B. polyantha*. Of course *B. polyantha* Hemsley does belong here, but, unfortunately, it has not been introduced to cultivation. PRATT, in 1889, collected three specimens, numbered 80, 206 and 704, upon which HEMSLEY based the species *B. polyantha*, making 206, which was in flower, the type; it so happened that PRATT's collection contained two different species, of which one, represented by 206 in flower, and the corresponding species 704 in fruit, has to remain as HEMSLEY named it, *B. polyantha*; but the other, represented by PRATT 80, a quite distinct species, had to receive a fresh name, which, over twenty years later, was provided by Dr. SCHNEIDER—*B. Prattii*, in honour of its collector; now the seed collected by PRATT would, naturally, pass into distribution as '*B. polyantha*,' but apparently, and unfortunately, it must all have come from his number 80, so that *B. Prattii* came into

general cultivation as '*B. polyantha*.' Some of the plants now sold as under this name are not even the true *B. Prattii*, but casual hybrid forms of it. *B. Prattii* has been collected again, since, by WILSON, but the true *B. polyantha* does not seem ever to have had its seed collected. Thus all hybrid forms influenced by this set trace their origin to *B. Prattii*.

Set 2. This differs from the preceding in having a shorter panicle, measuring generally only 1.5-2.5 cm., although occasionally extending to 4 cm., and the flowers, in most cases, are densely arranged. This has been called the subsection *Subpolyanthae*, and its most common member is *B. aggregata* Schneider, although there is also to be found in cultivation (but very rarely) the finer, Himalayan, *B. Edgeworthiana* Schneider, with firmer, brilliant orange-red berries; both these species owe their dense form of inflorescence to their very short pedicels, measuring only 1-2 mm., and they both possess, at the base of these, bracts which exceed them in length, an unusual feature which is not reproduced in any of the hybrids, which, inasmuch as this set has had influence, are descendants of *B. aggregata*. A species from Hupeh, *B. brevipaniculata* Schneider, also belongs here, but this is not, and never has been, in cultivation; but for some reason casual hybrid forms have been called by this name.

Both these sets possess deciduous, spinose leaves, pale yellow or grey stems, and only 1 or 2 ovules within the ovary, and they form the main body of the section *Polyanthae*; but there is a third set included within it which varies very much from the standards set by the other two :—

Set 3, called, for this reason, the subsection *Pseudopolyanthae*. The inflorescence contains only a few flowers, some 3 to 8, occasionally as many as 12, and its form is never panicate, but generally fascicled, occasionally in a raceme so short as to be subfascicled and measures 5-10 (rarely to 15) mm. Here belong *B. Wilsonae* Hemsley, *B. subcaulialata* Schneider, and *B. Stapfiana* Schneider, which are responsible for many of the hybrid forms. These three species are also distinguished from those of the preceding two sets by having entire, persistent, or semi-evergreen leaves; dark, red or purple stems; and 3 to 5 ovules within the ovary, characters, therefore, which are important in the survey of the hybrids, although not essentially diagnostic of this set because it contains also certain other species with a few-flowered non-paniculate inflorescence which have deciduous, or spinose leaves, pale yellow stems, or only 1-2 ovules, such as *B. parvifolia* Sprague, and *B. arido-calida* Ahrendt (Farrer 355), which are rare in, or new to, cultivation, and have played no part in forming the hybrids.

Finally, in surveying the species concerned, we must consider :—

Set 4. Here, again, there is an inflorescence containing but a few flowers (1 to 8, with one exception, *B. Tischleri*, which has up to 14); often the flowers are solitary, and the ovules number 6-15; but sometimes the inflorescence is fasciculate, umbellate, or loosely subracemose so as to be pseudo-umbellate; and in many less characteristic

species, the ovules, as in the last set, number 3 to 5, but in these cases the large diameter of the flowers, and length of the berries (frequently estylose), each measuring 1-2 cm., offer an obvious distinction. This large flowered and berried set is called the Section *Angulosae*.

The species concerned, and their influence, may thus be summarized as follows :

1. *B. Prattii*. Elongated panicle, 5-10 cm. Spinose deciduous leaves. Ovules 1-2. Stems pale yellow.

2. *B. aggregata*. Short dense panicle, 1.5-2.5(-4) cm. Spinose deciduous leaves. Ovules 1-2. Stems pale yellow.

3. Several species. Few-flowered fascicle, 5-10(-15) mm. Leaves entire, semi-evergreen. Ovules 3-5. Stems dark, red or purple. *B. Wilsonae* (stems puberulous, berries globose); *B. subcaulialata* (stems glabrous, berries globose); *B. Stapfiana* (stems glabrous, berries ellipsoid).

4. Section *Angulosae*. Umbellate, peduncled inflorescence. Flowers and berries large (1-2 cm.), or ovules 5-8.

We may now approach the hybrids themselves, and survey them in a similar way; some belong, without reserve, to one or other of these four sets, and may be regarded either as hybrids between two species of the same set, or between two members of different sets where one parent has predominated to the extent of imposing all the salient features of its set, the influence of the other being shown in lesser characters. Other hybrids, however, cannot be fitted into these sets for their characters are intermediate, neither parent has dominated; thus we have to insert a set 2A with panicles of flowers, and 3-5 ovules, and, often, dark stems, and a set 4A with paniculate inflorescence, and 5-7 ovules.

ENUMERATION OF HYBRID FORMS.

Set 1. Panicles elongated. Ovules 1-2.

1. BERBERIS 'STONEFIELD GLOW,' differing from *B. Prattii* in its entire persistent leaves, and larger (7-8 mm.), softer, globose, scarlet (H.C.C. 19) berries. (*B. Prattii* × *B. subcaulialata*).

Set 2. Panicles short. Ovules 1-2. All have longer pedicels (with shorter bracts) than in *B. aggregata*.

A. With stems pale yellow and puberulous and leaves deciduous as in *B. aggregata*.

2. BERBERIS 'STONEFIELD DAWN.' Leaves pale yellow-green. Berries globose, 4-5 mm., carmine (H.C.C. 21).

B. With stems pale yellow, but glabrous. Leaves deciduous.

3. BERBERIS 'SIBBERTOFT CORAL.' Berries ovoid, 6-7 × 5-6.5 mm., carmine (H.C.C. 21).

4. BERBERIS 'CRIMSON BEAD.' Berries oblong, 4.5-5 × 3.5-4 mm., crimson (H.C.C. 22, a darker shade).

C. With stems dark red and puberulous, as in *B. Wilsonae*. Leaves persistent.

5. BERBERIS 'RUBY.' Berries ovoid, $5.5-6.5 \times 4.5-5.5$ mm., ruby-coloured (H.C.C. 22/1).

Set 2A. Panicles short. Ovules 3-5. All have longer pedicels (with shorter bracts) than *B. aggregata*, and differ also in their glabrous stems.

A. With panicles sessile, or almost so, as in *B. aggregata*.

a. With stems pale yellow; leaves entire, narrow (1:3.5-4), semi-evergreen.

6. BERBERIS 'BUCCANEER.' Berries globose, 9 mm., almost estylose, partly whitish, ultimately geranium like (H.C.C. 20) (influence of *B. aggregata*, *B. subcaulialata*, *B. Jamesiana*).

b. With stems dark red; leaves entire, broader (1:2.5-3).

7. BERBERIS 'PIRATE KING.' Leaves deciduous. Berries globose, $5.5-6.5$ mm., pale scarlet (H.C.C. 19/1). (*B. aggregata* \times *B. subcaulialata*.)

8. BERBERIS 'BARBAROSSA.' Leaves semi-evergreen. Berries oblong- or globose-ovoid, $6.5-7$ mm., scarlet (H.C.C. 19). (*B. aggregata* \times *B. subcaulialata*.) Fig. 43.

9. BERBERIS 'BOUNTIFUL.' Leaves semi-evergreen. Berries globose, or oblong-globose, $7.5-8.5$ mm., scarlet (H.C.C. 19). Flowers large, 10-11 mm. diameter.

B. With panicles with peduncle 1-3 cm. long. (Influence of Sect. *Angulosae*, Set 4.)

a. With stems pale yellow. Leaves deciduous.

10. BERBERIS CARMINEA. Leaves narrow (1:4), spinose. Berries ovoid, $8-9 \times 6.5-7$ mm., carmine (H.C.C. 21). Fig. 44.

11. BERBERIS 'SPARKLER.' Leaves broader (1:2.5), entire. Berries ovoid-subconical, mandarin red (H.C.C. 17/1).

b. With stems dark red; leaves entire, deciduous.

12. BERBERIS 'AUTUMN CHEER.' Leaves broad (1:2.5). Berries oblong-ovoid, $6-7 \times 5-6$ mm., scarlet (H.C.C. 19).

13. BERBERIS 'FIREFLAME.' Leaves narrow (1:3.5). Berries ovoid, 6.5×5.5 mm., carmine (H.C.C. 21).

14. BERBERIS 'AURORA.' Leaves narrow (1:4). Berries globose-ovoid, 8.5×8 mm., vermilion (H.C.C. 18).

Set 3. Inflorescence few-flowered, fascicled or subracemose; flowers and fruit fairly small. Ovules 3-5.

A. Stems puberulous, as in *B. Wilsonae*. Berries small, globose, 4-5 mm., carmine (H.C.C. 21).

a. Stems yellow; shrub 4 feet tall; inflorescence sessile; leaves narrow (1:4).

15. BERBERIS 'TOM THUMB.'

- b. Stems red; shrub 4 feet tall; inflorescence with peduncle 1.5-2.5 cm.; leaves broader, semi-evergreen.

16. BERBERIS 'STONEFIELD SURPRISE.'

- B. With stems glabrous and dark red, as in *B. subcaulialata* and *B. Stapfiana*. Leaves semi-evergreen except in 'Firefly' which is deciduous.

- a. With very narrow leaves (1: 5-6).

17. BERBERIS 'FERAX.' Berries oblong-ovoid, 5-6 × 3-3.55 mm., scarlet (H.C.C. 19).

18. BERBERIS SMITHIANA. Berries globose-ovoid, 6 × 5 mm.

- b. With leaves broader (1: 2.5-3).

- (i) With small flowers, 6-8 mm. diameter.

19. BERBERIS 'COMET.' Berries globose-ovoid, 6-6.5 mm., scarlet (H.C.C. 19).

20. BERBERIS 'CORAL.' Berries oblong-ovoid, 5-5.5 × 4-5 mm., carmine (H.C.C. 21).

21. BERBERIS 'FIREFLY.' Berries ovoid-conical, 7-8 × 6-7 mm., vermilion (H.C.C. 18). Fig. 44.

- (ii) With large flowers, 9-11 mm. diameter.

22. BERBERIS 'FIREBALL.' Berries ovoid-conical, 7-8 × 6-7 mm., vermilion (H.C.C. 18).

Set 4. Fairly typical members of the *Angulosae*, with large flowers and fruit, but showing the influence of *B. aggregata*, or *B. Wilsonae* in the short pedicels. Ovules 3-5. Leaves deciduous.

- A. With glabrous stems, and narrow leaves (1: 3-4); flowers large, 1.5 cm. diameter.

23. BERBERIS RUBROSTILLA. Peduncle 3-5 mm. Berries ovoid, shiny, scarlet (H.C.C. 19), 15 × 9-10 mm. Fig. 43.

23A. BERBERIS RUBROSTILLA var. CRAWLEYENSIS. Peduncle 1.5-3 cm., berries shiny, scarlet, 15-17 × 5-6 mm.

23B. BERBERIS RUBROSTILLA var. CHEALII. Berries dark red-purple, 9-11 × 6.5-7 mm.

- B. With puberulous stems, and broader leaves (1: 2-2.5); flowers small, 7-9 mm. diameter.

24. BERBERIS 'CHERRY RIPE.' Leaves entire. Peduncle 2-4 cm. Berries shiny, a darker shade of geranium lake (H.C.C. 20).

25. BERBERIS 'EMPEROR.' Leaves spinose. Inflorescence sessile, or with peduncle 1-2 cm. long. Berries dull, geranium lake (H.C.C. 20), oblong-ovoid, 10-12 × 9 mm.

Set 4A. Inflorescence paniculate as in set 2, but with 5-7 ovules as in set 4. Stems glabrous, dark red. Leaves entire. Berries scarlet (H.C.C. 19).

26. *BERBERIS* 'AUTUMN BEAUTY.' Leaves almost deciduous, broad (1:2-2.5), with rounded apex; flowers 8-9 mm. diameter; berries ovoid, 9 × 8 mm. Fig. 45.

27. *BERBERIS* 'KNOCKVALE SCARLET.' Leaves almost evergreen, narrow (1:4.5-6) with subacute apex; flowers 10-12 mm. diameter; berries ovoid-globose, 7 mm.

It will be appropriate to mention here that there is a set of natural species (called the subsection *Metapolyanthae*) which corresponds in its primary characters to what has been here called Set 2A, that is, combining a panicle inflorescence with the presence of 3 to 5 ovules within the ovary. I have kept this separate in the discussion because this combination of characters in the hybrids mentioned is not due to the influence of any such species, but arises independently, as indicated, from hybridization between, and consequent combination of, the characters of two other distinct sets (numbered 2 and 3). The enumeration of the named hybrids may well be concluded with one possessing this combination of characters through derivation from a species similarly equipped. It was grown from seed of *B. Beaniana* Schneider.

28. *BERBERIS* 'STONEFIELD MAUVE.' Leaves deciduous, spinose. Berries oblong, elliptic, 8 × 6 mm., dark red, with conspicuous mauve bloom, and no style.

SOURCES OF HYBRID FORMS.

- A. Raised at Wisley, where the original plants still remain—10 *carminea*, 11 'Sparkler,' 12 'Autumn Cheer,' 13 'Fireflame,' 14 'Aurora,' 17 'Ferax,' 19 'Comet,' 20 'Coral,' 21 'Firefly,' 22 'Fireball,' 23 *rubrostilla*, 25 'Emperor,' 26 'Autumn Beauty.'
- B. 'Sibbertoft Coral' originated at Wisley from seeds sent to the Marquess of Headfort, whence some, or resultant seedlings, were passed on to Lady Beatrix Stanley, Sibbertoft Manor, Leicestershire; here the hybrid received its name, and it is now represented at Wisley by a plant from Sibbertoft; the Wisley original which produced the seed is unknown.
- C. 27 'Knockvale Scarlet' was raised from Wisley seed, the plant being sent labelled 'rubrostilla' to Knockvale House, Belfast, where it was named by Mr. MULLIGAN, and whence a plant has gone to Wisley.

For the material of the preceding I am indebted to Mr. BRIAN O. MULLIGAN of Wisley.

- D. Raised at the nursery of Messrs. WATSON AND SONS (from whom I received authentic material), Killiney, Dublin—5 'Ruby,' 6 'Buccaneer,' 8 'Barbarossa.'
- E. Raised by Messrs. WATERER, SONS AND CRISP, at Bagshot, Surrey—7 'Pirate King.' My material came from Wisley.
- F. 15 'Tom Thumb' was raised in the garden of Mr. SIDNEY MORRIS, at Earlham Hall, Norwich, from seed of Wisley hybrids; see

R.H.S. JOURNAL, 49, 1923, and *Garden*, 87, 555, 1923. The form has been propagated by Messrs. R. C. NOTCUTT, Woodbridge, Suffolk, from whom I received my material.

- G. Raised at the nursery of Messrs. CHEAL, Lowfield Heath, Crawley, Sussex (from whom I received material)—23A *rubrostilla* var. *crawleyensis*, 23B *rubrostilla* var. *Chealii*.
- H. Raised by my mother, Mrs. A. R. AHRENDT, at Stonefield, Watlington, Oxfordshire—1 'Stonefield Glow,' 2 'Stonefield Dawn,' 4 'Crimson Bead,' 9 'Bountiful,' 16 'Stonefield Surprise,' 24 'Cherry Ripe,' 28 'Stonefield Mauve.'
- J. 18 *Smithiana* was raised by Messrs. C. SMITH at Caledonian Nursery, Guernsey.

It will be seen that these casual hybrids, far from being close, or almost inseparable, forms, can easily be distinguished by their botanical characters. It is hoped that this analysis will enable those possessing named hybrids to check the accuracy of their plants, and those considering naming fresh ones to investigate the degree of originality of their plants before doing so.

The *Angulosae* characters which appear in some of these forms may possibly all be traced to *B. rubrostilla*, which has sometimes been referred to as a hybrid between *B. Wilsonae* and *B. aggregata*, which is scarcely likely, and sometimes as an unrecorded species. Its author, Mr. CHITTENDEN, has made clear to me the facts, and given me permission to reproduce his statement. The seed which produced *B. rubrostilla* came from a plant which : (1) came to Wisley from the Combe Wood nursery along with *B. Wilsonae*, and under that name ; it may have been raised directly from imported seed, but, considering the date it reached Wisley, even more likely from seed saved there ; (2) had the habit of *B. Wilsonae* entirely but differed in shade of colour of fruit which was more solid looking, and somewhat larger ; further (3) *B. rubrostilla* was the only seedling of exactly that form raised from its parent, though several others varied greatly from the parent. Mr. CHITTENDEN thinks that it is probably a secondary hybrid, and not a first cross.

CORRECTION.

On p. 109, R.H.S. JOURNAL, March 1942, the top line should read "*Flowers Pale Blue*" not "*Yellow*."

HYGIENE IN THE WAR-TIME VEGETABLE GARDEN.—XIV.

By D. E. GREEN, M.Sc., Mycologist, Wisley.

MOST of the commonly used vegetables have now been discussed, but among the remainder we can include various herbs which play quite an important part in our diet, and which some people, at any rate, would consider indispensable in the preparation of good meals.

HORSE RADISH.

BLACK ROT.

Horse Radish can be affected by the Black Rot parasite *Pseudomonas campestris* which has already been described for Turnip (R.H.S. JOURNAL, January 1942, p. 34) and Seakale (R.H.S. JOURNAL, March 1942, p. 98). On Horse Radish the symptoms are similar and there is an unhealthy look about the foliage owing to the vascular system (conducting vessels) in the plant being invaded by the parasite. When the root is cut across the typical blackened, ringlike effect can be seen, and such plants should be destroyed whenever noticed. Root blackening may possibly be caused by other parasites which enter through wounds, but destruction of affected sets is the best remedy.

WHITE BLISTER.

The fungus *Cystopus candidus* is able to attack Horse Radish leaves causing glistening white pustules just as it does on Cabbage, Brussels Sprouts, etc. (see R.H.S. JOURNAL, March 1941, p. 93). Removal of affected leaves and good spacing of plants should check this fungus, which in most cases should not be of serious import.

LEAF SPOTS (PALE SPOT).

There are several leaf spotting fungi which affect Horse Radish foliage, but none are of any importance. Perhaps the one most commonly seen in Great Britain is that known as Pale Spot, caused by the fungus *Ramularia armoraciae* which causes pale, almost white, spots on the leaves (Fig. 46). This spotting can be very extensive and the killed tissues in some cases fall out leaving a "shot-hole" appearance. Nevertheless, this leaf spotting is not usually of much importance.

MUSHROOMS.

As is well known the edible Mushroom, *Psalliota (Agaricus) campestris*, is itself a fungus, but it can be attacked by other fungi. This is especially true of the horticultural variety grown by gardeners in composted manure under artificial conditions. We can, therefore, include it in these articles on vegetable troubles, although it is admitted that the greatest danger to Mushroom crops grown by amateurs is the

possibility of insect pests, especially the flies known as Fungus Gnats. Here, however, we must deal with fungi that are detrimental to the edible Mushroom.

BUBBLES DISEASE OR WHITE MOULD.

This is also called Mushroom disease, and is due to the fungus *Mycogone perniciosa* which covers the Mushrooms with a whitish mould-like growth and the stalks become short and swollen, while the cap, being checked in development, is usually very small. The trouble takes various forms—on a large Mushroom the gills only may be infected, while in other cases whole clumps of very young Mushrooms grow into shapeless masses covered with the white mould-like growth (Fig. 48). The affected Mushrooms quickly decay, and in a few days smell badly. This disease is difficult to eradicate and only the strictest attention to clean methods will keep it down. Diseased specimens should be removed with their "roots" for burning, and all waste stalks or injured Mushrooms must always be treated the same way. The temperature must be kept down as far as possible in the region of 50° F. After a crop has been taken the strictest attention should be given to cleaning the shed. The old bed and some of the floor soil should be removed and the whole place inside sprayed with some disinfectant such as 2 per cent. formalin, 2 per cent. cresylic acid, lime sulphur solution 1 gallon to 15 gallons water, after which the house is closed for twenty-four hours and then thoroughly aired. It is considered improbable that the disease is introduced with the manure because it does not survive the temperatures which are reached while composting is going on (140° F. and above). The casing soil is a more probable source of infection, and many growers now practise partial sterilization of casing soil, and it seems the amateur would be well advised to use sterilized soil for small beds.

BROWN BLOTCH.

The caps of Mushrooms are sometimes discoloured by brown blotches due to *Pseudomonas Tolaasii*. It is difficult to state the probable source of such infection, but it is known that the trouble is encouraged by excessively warm and damp conditions and it should be checked by keeping the temperature around 50 to 55° F., ventilating properly and perhaps watering with half per cent. chloride of lime solution.

MUSHROOM BED "WEED" FUNGI.

Besides the parasites which damage Mushrooms by actually growing on them, there are several fungi which become enemies because they grow in the manure and thus are in competition with the Mushroom threads or "spawn." They might be described as "invaders" of Mushroom beds and are here briefly described.

1. *White Plaster Mould* is due to the fungus *Monilia (Oospora) fimicola*, which appears as a white powdery substance resembling scattered plaster or lime on the surface of the bed about spawning

time or just afterwards. There is no means of eradicating it, and in good beds it may not do much harm, but in some cases may reduce the crop. How it comes into the beds is not known, but if composting is properly done it is not likely that this trouble will matter much. At the same time, it shows the necessity for proper disinfection of Mushroom sheds after the crop is over.

2. *Brown Plaster Mould* is due to the fungus *Papulaspora byssina*, which makes white fluffy or matted patches of fungus growth on the compost. In a few days the centre of such a patch turns brown, and when the bed is cased the fungus grows through the soil and again forms its patches on the surface. These patches may show as a brown area with a white fringe, but in the end are completely brown and are then rather powdery. The fungus is thought to be brought in with the manure. In a good bed of well composted manure it is unlikely to do serious damage—less so than the White Plaster Mould—but in cases where beds are of poor quality it may reduce cropping to some extent. Much depends on correct composting.

3. *Mushroom Bed Sclerotium*.—A fungus which may invade Mushroom beds is *Xylaria vaporaria*, which grows in the manure with its white threads (mycelium) but later forms its sclerotia (resting bodies) in the casing soil. The fungus and its sclerotia may occasionally be found in cucumber beds, but there it is not very harmful as it is not competing directly with the cucumber roots and is not dangerous to them. The sclerotia are irregularly shaped, black, and rather branched structures having a cucumber-like smell (Fig. 49). The presence of the fungus is sometimes detected because the tips of these branches appear on the surface of the casing soil and are pinkish in colour. It is said that the remedy is to search for and weed out the fungus by pulling out the sclerotia when they form, and that afterwards the bed will grow normally.

4. *Mushroom Bed Brackets*.—The fungus here concerned is *Clitocybe dealbata* which has occasionally been known to appear on Mushroom beds. This is a toadstool-like fungus, each with its stem and white satiny cap and thin white gills, occurring in clumps perhaps 1 to 3 feet across. The caps soon turn upwards and then have wavy irregular edges. These toadstools are the fruiting bodies of the fungus which is sending its rather coarse white mycelium (mass of fungal threads) throughout the manure of the bed. Where such a fungus is abundant, it is unlikely that the Mushroom spawn can compete successfully and the bed will probably be a poor one. Certainly great care should be exercised in disposing of any infected bed and in seeing that the shed is properly disinfected afterwards.

ROSE COMB.

This is a functional disorder in which the Mushrooms grow deformed. The deformity may be severe—the caps are very distorted and cleft, while the gills grow irregularly and some gills may be produced in the clefts or on top of the deformed cap. The name arises

owing to this last deformity which somewhat resembles the rose or crush comb of a fowl. The trouble is due to the use of mineral oil sprays or to the fumes from oil stoves, etc., the latter being the most likely cause.

CRACKING.

The caps of Mushrooms sometimes crack through too dry an atmosphere, and matters should be remedied by more frequent sprinkling of bed and paths with water.

MINT.

Although several diseases of Mint are known, the most important one is Rust.

RUST.

This is a very common trouble on Mint and is caused by the fungus *Puccinia Menthae* which forms all its stages on the Mint plant. The signs are easy to recognize, for in spring or early summer the affected shoots become swollen and malformed and are generally lighter in colour than normal shoots. On these swollen parts (Fig. 47) there are produced numbers of cup-shaped craters (cluster cups) which produce orange-coloured spores in such numbers that the stem appears yellowish-orange in colour. These are the spring spores (aecidiospores) which carry infection to other plants. As a result the leaves become infected and show yellow or brown spots giving rise to the summer spores (uredospores) which spread the disease to other leaves. In autumn black spots denote the appearance of the dark-coloured winter spores (teleutospores), which are washed into the soil and so into bud scales, where in spring they germinate and infect the shoots so as to produce the cluster cups. This disease can be a great nuisance in Mint beds, but in gardens, despite the rust, there are usually enough healthy shoots to meet requirements.

Some control may be gained by burning off the old Mint foliage and stems at the end of September, using sufficient straw to give a quick brisk fire which will burn the old stems and kill the disease spores without killing the roots. Where, however, a large quantity of Mint is forced in greenhouses during winter and early spring, it is advisable to have healthy sets free of spores for this indoor planting, and this can be done by means of the warm water treatment. The plants are lifted and the soil is washed or hosed from them and they are then placed in water at 112° F. for ten minutes (between 105° and 115° will do *but not above* 115°). While immersed, the roots can be stirred to keep the water temperature uniform. After ten minutes the roots should be removed and washed or hosed with cold water at once, after which they (or suitable parts) can be planted.

MILDEW.

In damp situations, Mint leaves may be attacked by one of the Powdery Mildews (*Oidium* sp.) causing the familiar whitish powdery

coating on leaves and stems, but this should not be serious in a good bed where the plants get sufficient water and fair treatment.

PEPPERMINT.

Peppermint plants (*Mentha piperita*) are likely to be affected by the troubles found on sweet Mint, but the most likely is Mint Rust, for which see under Mint.

PARSLEY.

Parsley plants are rarely affected by disease, but one or two fungi are occasionally reported as causing injury.

LEAF SPOT.

Although not very common, the fungus *Septoria Petroselinii* may appear on Parsley leaves in midsummer causing minute spots at first brown, then almost white with little black dots scattered on the surface and occurring anywhere on the leaves. These spots are very similar to those caused by the closely related fungus *Septoria Apii* on Celery foliage (see R.H.S. JOURNAL, April 1941, p. 134). If this disease shows on Parsley it should only be necessary to destroy the diseased stock and to plant new seed on a fresh site. Do not use seed from the old packet, as this disease can be seed-borne and this may be the source of infection.

RUST.

There is a rare rust of Parsley foliage due to the rust fungus *Puccinia Aethusae*, which has not been observed for some years and is probably not common in this country. The signs are small rusty cinnamon-coloured pustules containing the summer (uredo) spores in summer and followed by darker brown pustules of autumn (teleuto) spores, both these stages generally being formed on the under sides of the leaves.

SAGE.

The Sage plant is not very subject to disease and the only trouble that may be expected on it is the Grey Mould fungus *Botrytis cinerea*, which has already been described on Tomato (R.H.S. JOURNAL, May 1941, p. 172) and on Lettuce, Cucumber, etc. This fungus is a common inhabitant of the garden and thrives on dead and decaying vegetable tissues in the presence of moisture. Where it causes damage to Sage foliage there can be little doubt that the conditions are very damp and possibly a good deal of dead foliage present. Removal of decaying branches and general thinning and cleaning of the bushes to allow circulation of air ought to eliminate the fungus, but it may be necessary to move the plants or take cuttings and plant them in a more open situation.

THYME.

Thyme plants are particularly hardy in this country and are not likely to suffer from disease. It is not out of place, however, to say

here that this plant in common with similar low growing herbs should receive fair treatment and be planted in well-drained suitable soil. The plants ought to be given occasional attention, such as cutting off the old stems and generally tidying up. Where the plants are uncared for and allowed to sprawl they become weak and encourage the growth of various fungi which would otherwise be harmless to them. For instance the type known as Slime Fungi are mostly not parasites, but in wet seasons are sometimes found injuring plants such as neglected herbs, rock garden plants, or even on strawberry beds. They appear as a creamy-white foamy mass which grows rapidly over the low growing plant and by a smothering effect soon weakens and kills it. Then the slime fungus begins to dry out and turns black or purplish-black, which indicates that it is forming masses of spores to enable it to spread. Although a fungicidal spray would soon kill such a fungus, there is no reason to be bothered with this kind of trouble if a little attention is given to cultivating the plants and removing old dead leaves and other debris (on which slime fungi live).

MUSTARD.

WHITE BLISTER.

The appearance of white pustules on the leaves of Mustard plants is due to the fungus *Cystopus candidus*, which has already been described on Cabbage, Turnip, Seakale and several other plants.

CLUB ROOT.

The well-known Club Root or Finger and Toe disease of Brassicas caused by the slime fungus *Plasmodiophora Brassicae* may appear on the roots of Mustard. The symptoms are much the same as described on Cabbage (see R.H.S. JOURNAL, March 1941, p. 91), and remedial measures are described under that heading.

CRESS.

DAMPING OFF.

The most usual trouble with Cress is the one known as damping off caused by various soil fungi, the chief one being *Pythium de Baryanum*. The symptoms are well known and easily recognized when the young plants topple over and lie on the soil, where they speedily wither and rot away. This is due to the fungus attacking the stem at soil level, and as the plant dies the parasite continues to destroy the tissues, finally forming resting spores to overwinter in the contaminated soil. Most people are aware that these damping off fungi are encouraged by damp conditions and that it is essential to provide a good open compost which has good drainage so that the soil does not get too wet and stagnant. These matters have already been discussed under damping off in Tomato seedlings (R.H.S. JOURNAL, May 1941, p. 168) and under

Lettuce (R.H.S. JOURNAL, July 1941, p. 251). The use of Cheshunt Compound (1 ounce in 2 gallons of water) is of great assistance in checking the spread of damping off fungi, but there is reason to believe that it is even more effective when used as a precautionary measure and the soil is well watered with the compound *before* the seed is sown.

WHITE BLISTER.

It is possible that the fungus *Cystopus candidus* may appear on Cress foliage, and this would necessitate speedy destruction of affected plants before the fungus forms its resting spores (oospores). For a description of the symptoms of White Blister see Cabbage White Blister (R.H.S. JOURNAL, March 1941, p. 93).

WATERCRESS.

VIRUS.

Not much is known about Watercress diseases, and these plants seem to keep very free from such troubles. There is, however, a mosaic type of virus thought to be the same as the one causing Yellow Mottle mosaic in Cucumbers (see R.H.S. JOURNAL, August 1941, p. 292) which may affect Watercress, causing the plants to be dwarfed with yellow mottling of the leaves, which may also be slightly deformed. Such plants should, of course, be destroyed.

This concludes the series of articles on Hygiene in the War-time Vegetable Garden. They are not claimed to be exhaustive regarding all diseases that may occur, but it is hoped that they have been useful to gardeners interested in vegetable growing and have made some small contribution to the increase in crops and avoidance of waste.

DRIED BEANS AND PEAS.

The Editors have received several communications regarding the growth of Haricot Beans, not only favourable ones but others reporting disappointment with the results. The correspondence makes it evident that even the best varieties available, e.g. 'Comtesse de Chambord,' can only be depended upon on the warmer southern and eastern soils. Except in favourable seasons gardeners north of the Trent or on cold soils, who desire to produce a stock of protein for the winter, will find it [safer to sow Peas for drying, such as Harrison's Glory,' about which an article appeared in the February issue of the JOURNAL. We have reports from Scotland of good results from this Pea.—A. D. H.

HAMBURG PARSLEY.

ANY gardener who has not yet tried this excellent root should do so as soon as possible ; for there is no more easily grown crop, and there are few more tasty foods.

It is usual to compare Hamburg Parsley with Parsnips, because the two roots look so much alike ; but the comparison is unfair. It implies that, however different from the Parsnip the Parsley may be, it is still more or less a Parsnip ; and therefore the many people who do not like Parsnips are put off the Parsley. The description " Turnip-rooted " is not good. " Parsnip-rooted " is better, so far as it indicates colour, skin texture and shape. In colour and skin texture the Parsley is just like a Parsnip, but its shape is better for it carries its substance round its waist, where the profile of a Parsnip has that coy concavity ; and does not thrust its treasure deep down in a wastefully long tail. Times of sowing and harvesting are exactly those of the Parsnip, and winter storage need mean no more than leaving the roots in the ground through any kind of weather. Ten inches between the rows and five between plants in the row is the lower limit of space.

The roots can be eaten raw, if grated or cut reasonably thin, and are thus the cheapest possible winter salad, with a delicious Parsley flavour that needs no comparison with any other vegetable. As an aid to the description of the cooked roots, Celeriac may be recalled. Parsnips are definitely not a standard of comparison. The cooked roots of the Parsley are tender right through, but the central part is softer than the outer part ; indeed it is almost like a jelly when well cooked in a casserole setting. Those members of my large household who cannot eat Parsnips come up eagerly for Hamburg Parsley. It has the power to awaken appetite and not merely to stun hunger.

Last year my Parsnip seed rotted in the ground as did that of many of my neighbours. My Hamburg Parsley, sown at the same time, grew perfectly. The roots were of a handy size, seven or eight inches long and three inches through in their thickest part, and nicely chubby. I treated them to a good layer of fat manure under the top spit. Only two or three per cent. of them forked badly. The season was too dry for them, and I could not supply the moisture they need to do well ; the soil was like a brick when they most needed water in the upper levels of their bed. They like the same conditions of moisture as one would give Celeriac, and they deserve the same trouble as one would give that plant. They have all its delicacy as food, all the hardness of Parsnips as living plants, and their own distinct individuality in flavour.

They are described in Vilmorin, but they grow larger than they are said to do in that somewhat lukewarm appreciation of them.

W. F. BELCHER.

BOOK REVIEWS.

"Plant Science Formulæ." By R. C. Maclean and W. R. Ivimey Cook. 8vo. vii + 203 pp. (Macmillan & Co., London, 1941.) 7s. 6d.

This is a book of great value for the botanical laboratory, "a book where the answers to all the little odds-and-ends in the running of a laboratory may be found." It contains recipes for the preparation of all the solutions required for the treatment of botanical specimens—preserving, fixing, staining and mounting, together with media for the culture of bacteria and fungi. The photographic workshop and other recipes will also be found extremely useful at times, and it is a great convenience to have them all gathered together in a single volume.

"Plants of New Zealand." By R. M. Laing, B.Sc., F.R.S., and E. W. Blackwell. 8vo. 499 pp. Ill. (New Zealand: Whitcombe & Tombs, Ltd.; London: Milford, 1940.) 21s.

"Plants of New Zealand" is already well known as a most useful guide to the flora of the Islands. The fourth edition is now published and differs from its predecessors by the addition of twelve coloured plates to supplement the 191 black-and-white illustrations.

"Alpines I have Grown." By Russell Leslie. 4to. 63 pp. Ill. (Lindsay Drummond, London, 1942.) 7s. 6d.

The thirty-nine alpines dealt with in this book seem to have been chosen rather because the author had recorded them pictorially than because they are representative of the alpine collection grown by Dr. Roger Bevan, of which Mr. Leslie is in charge. The brief descriptions give little new information; as regards the illustrations, though the formalized treatment is distinctly decorative in some cases, it is hardly naturalistic enough to assist in the identification of a plant, and a predilection for curved lines, which finds its highest expression in *Cypripedium pubescens* (recently out of curling papers), becomes irritating by repetition. The book will probably make a greater appeal to admirers of modern wood engraving than to growers of alpines.

"Lily Bulletin." Prepared by the Lily Committee of the American Horticultural Society. 8vo. 23 pp. (Amer. Hort. Soc., 821 Washington Loan and Trust Building, Washington, D.C., U.S.A., 1941.) 25 cents.

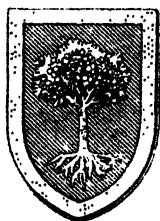
An excellent publication giving in handy form the essential facts regarding the cultivation of Lilies. Although written primarily for American conditions, the greater part of it is applicable to British gardens. It is just the sort of thing a beginner wants, and many experienced gardeners will find it useful.

"Amateur Gardening Pocket Guide." Compiled by A. G. L. Hellyer. (3½ × 2½ ins.) 320 pp. (W. H. & L. Collingridge, Ltd., London, 1941.) 3s. 6d.

Within, literally, very small compass a large amount of information invaluable to the practical gardener has been compressed. The booklet is divided into eight chapters which cover the subject very adequately, Vegetable, Fruit and Ornamental Gardens being dealt with as well as Greenhouse and Frame; there are useful tables of weights and measures, a full and detailed calendar of operations, and an index. To get so much into such a little space has meant using a rather small type, but this is clear and the printing well done, so that in these days of paper shortage this pocket book might well serve as an example of the most economical use of that commodity. Both novice and professional will find it an excellent reference book which can be always at hand.

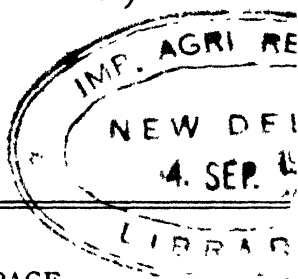
JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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Part 5



THE SECRETARY'S PAGE.

The Journal.—In order to comply with the demand for further reduction in weight of paper used, the JOURNAL will appear henceforth without its usual cover, and in future only one copy will be supplied to Societies who have previously received more than one, except in such cases where more are deemed essential, when every endeavour will be made to supply an extra copy.

Monthly Shows.—The monthly Show will be held on May 19 (12 noon to 6 P.M.) and 20 (10 A.M. to 5 P.M.), and will include exhibitions by the Rhododendron Association and the Alpine Garden Society. There will also be Sewell Medal Competitions for alpine and rock garden plants and the competition for amateurs for flowering trees and shrubs; particulars of these competitions can be obtained on application to the Secretary. A Show will also be held on June 16 and 17 at which there will be a competition for amateurs for flowering shrubs. The Iris Society will co-operate at this Show.

Demonstrations at Wisley.—Two demonstrations will be held at Wisley this month, both in the Vegetable Garden. On May 13 and 14, from 2 to 4 P.M., there will be a demonstration on the Control of Vegetable Pests and Diseases, and on May 27 and 28, from 2 to 4 P.M., one on Thinning, Transplanting and Successional Cropping. On June 3 and 4, from 2 to 4 P.M., there will be a demonstration of Summer Pruning of Shrubs in the Flower Garden.

Advice on Technical Subjects.—All requests for horticultural advice, advice on diseases, soils and manures, and for the identification of plants, should be addressed to The Director of the R.H.S. Gardens, Wisley, near Ripley, Surrey. All fruits for naming should also be

sent to the Director of the Society's Gardens at Wisley, and not, as has been formerly the practice, to the Society's Offices in London.

Lindley Library.—The Library is open daily (Sundays and holidays excepted) from 10 A.M. to 5 P.M. (Saturdays 10 A.M. to 12.30 P.M.). Anyone requiring the loan of a book to be taken from the Library must make written application to the Secretary, and loans will be granted under certain conditions, but all books borrowed must be returned to the Library in good condition within one month from the date of issue.

Horticultural Colour Chart (Volume II).—The second volume of the Horticultural Colour Chart is now available. It is regretted that the price of the second volume has had to be increased to 12s. 6d. post free to Fellows, remaining at £1 2s. post free to non-Fellows. It is hoped to circularize all those who subscribed to the first volume, but it will be helpful if subscribers would apply, enclosing remittance, without awaiting the circular. With the issue of this second volume, the Chart will be complete. It is believed it will be found to fulfil the object in view, namely that of providing a "colour guide to the garden." The first volume is still available to Fellows at 11s. post free, and to non-Fellows at £1 2s. post free. Members of affiliated societies applying through the secretary of the affiliated society may obtain the volumes at the Fellows' rates.

Examinations.—Fellows will be pleased to hear that arrangements for holding the Society's Examinations in the Prisoner of War Camps have been perfected and a number of candidates have applied to sit. The necessary papers are now being forwarded through the Red Cross for the various camps.

"The Vegetable Garden Displayed."—The fourth impression of "The Vegetable Garden Displayed" will be available this month, but it is regretted that, owing to the rise in the price of paper, etc., the book will now be 1s. 9d., plus 3d. postage, instead of 1s. 6d. post free.

Plants for Award.—All plants submitted for award must be entered with the Secretary of the appropriate Committee and an entry form fully filled in with respect to each. So that the necessary secretarial work may be carried out, all entries must be received not later than half an hour before the time at which the Committee sits. Entries cannot be accepted later, but in view of the present difficulties of transport, the receipt of an entry form by the required time will count, provided the exhibits themselves arrive soon enough to be properly arranged for inspection by the Committee.

Entry forms can be obtained on application to the Secretary and, if returned by post, should reach Vincent Square on the Monday preceding a Meeting, if possible; certainly by first post on the day of the Show at latest.

The times at which exhibits must be received by the various Committees are given below. The Scientific Committee meets during the afternoon and plants of botanical interest presented to other

Committees may be passed on to it by such a Committee at its discretion.

Fruit and Vegetable Committee—11.30 A.M.

Floral Committee A. (Florist's flowers)—11.45 A.M.

Floral Committee B.—11.30 A.M.

Orchid Committee—10.30 A.M.

Narcissus and Tulip Committee—10.30 A.M. (February to May).

Joint Border Carnation and Picotee Committee—11 A.M. (July).*

Joint Perpetual-flowering Carnation Committee—10.30 A.M. (April).*

Joint Early-flowering Chrysanthemum Committee—10.45 A.M. (August and September).

Joint Dahlia Committee—10.30 A.M. (August to October).

Joint Delphinium Committee—10.30 A.M. (June and July).

Joint Iris Committee—11.45 A.M. (April to July).

Joint Rhododendron Committee—10.45 A.M. (February to June).

Joint Rock Garden Plant Committee—12 noon.

When a Joint Committee does not meet, or there is no quorum, the exhibits intended for that Committee will be passed on to Floral Committee A or B.

* And by arrangement on other dates.

WISLEY IN MAY.

THOSE who can spare time from their war-time duties to visit Wisley during this month will find much to interest and please them, and may enjoy temporary relief from anxiety amid the fresh green of the trees and the ever-increasing variety of flowers. Among the very large numbers of interesting plants this month the Japanese Cherries, Crabs, Azaleas and Lilacs claim special attention, and the Rock Garden will be almost at its best.

The main collection of Japanese Cherries forms an avenue leading up the hill towards the Alpine house. The vigorous, rose-coloured 'Kwanzan' is a general favourite, and the late-flowering 'Oku-Miyako,' notable for its long-stalked clusters of double white flowers, is equally desirable. Other distinctive varieties in the collection are 'Fugenzo,' with deep pink flowers densely massed along its branches, and 'Ukon,' garlanded with Primrose flowers and bronze-tinted young leaves. On either side of the main avenue there are various Crabs, including *Malus Eleyi*, *M. Lemoinei* and the fine double-flowered *M. magdeburgensis*; the richly coloured double Peach, *Prunus Persica* var. *magnifica*, *Cercis Siliquastrum* the Judas-tree, and many other good shrubs and trees.

In the Alpine house, some of the choicer species are the lavender-coloured *Daphne Genkwa*, the tiny hummocks of *D. rupestris* var.

grandiflora almost covered with large, rose-pink flowers, *Lewisia Tweedyi* in pale creamy-pink above delicate green leaves, purple-winged *Polygala Vayredae*, *Gentiana verna* and *Erinacea pungens* with soft lavender flowers protected by formidable spikes.

Among the varied hues of the Rock Garden certain bold patches of colour at once attract the eye—Aubrietias are at their best, as are the variously coloured mossy Saxifrages. A striking contrast is provided by the glistening gold of the double King-cups, *Caltha palustris fl. pl.* and by the shrill, yellowish-green of *Euphorbia epithymoides* (Fig. 52) growing on a mound near the centre of the Rock Garden. Lower, by the pond-side, a taller species of less insistent colour, *E. palustris*, tones well with the rusty, developing fronds of the Royal Fern. Here, too, the Cape Pond-weed, *Aponogeton distachyon* and *Saxifraga peltata* will be in flower. In a shady corner the sweet scent of *Daphne Blagayana* mingles with that of *Osmanthus Delavayi* growing nearby. Other fragrant shrubs flowering now are *Viburnum Carlesii* and *Daphne Cneorum*.

The many varieties of *Phlox subulata* never fail to cover themselves with flower, and the dwarf lilac *P. Douglasii* and the taller lavender *P. divaricata* are equally reliable. Besides these can be seen *Ramondia Nathaliae*, *Haberlea Ferdinandi-Coburgii*, *Primula involucrata* and its rosy-purple Chinese subspecies *P. yargongensis*, *Gentiana acaulis* and the very pretty Primrose-coloured Narcissus 'Hawera,' a vigorous and free-flowering Triandrus hybrid from New Zealand. Some of the Tulip species are suitable for the Rock garden, and of those to be seen at Wisley, *Tulipa tarda*, yellow-eyed with white-tipped petals, and *T. Aucheriana* (Fig. 51), a "good doer" with soft rose, yellow-backed flowers, may be recommended.

In the Wild Garden the visitor will find Rhododendrons and the earlier Azaleas in bloom. *R. decorum* with flat pink or white pleasantly scented flowers, *R. caloxanthum*, yellow, *R. hippophaeoides* with many small, lavender-blue flowers, and the richly coloured forms and hybrids of *R. obtusum* are noteworthy. Along the banks of ditches and in the moist, peaty beds beneath the oaks is a brightly patterned carpet of small herbaceous plants, including Trilliums in pink and white, Welsh Poppies both yellow and orange, tall Spanish Bluebells and the first spikes of *Primula japonica*, broken here and there by the massive glossy leaves of *Lilium giganteum*.

During the early part of the month Seven Acres will be gay with the many species and hybrid Crabs, of which the graceful *Malus Zumi*, with pale pink clusters, *M. Sargentii*, of more compact habit and rounded white flowers, and the deep rose 'Wisley Crab' are noteworthy. *M. hupehensis (theifera)*, coming when most of the others are over, has large, fragrant flowers not unlike Cherry blossom, and is one of the most handsome Crabs. Species of *Spiraea*, *Exochorda*, *Lonicera* and *Berberis* are all worth seeing at the present time, and at the eastern end of Seven Acres the visitor will find a small collection of Lilacs. Many more fine varieties are planted in Howard's Field, which is

reached by a pleasant path beside the river or by going through the Pinetum. In Howard's Field there will also be hybrid Brooms, species of *Cistus* and the earlier Rose species, *R. altaica* with flat, creamy-white flowers 3 inches across, and *R. Hugonis* with slender, wand-like growths covered with clear yellow blooms.

The Temperate house makes its main contribution this month in flowers of particularly vivid colours. The changing blue-violet of *Ipomoea Leari* and royal purple of *Tremandra verticillata*, *Fremontia mexicana* in rich yellow, *Callistemon citrinus* var. *splendens* bearing crimson Bottle-brushes are rivalled by many-hued Pelargoniums. *Asystasia bella* in cool heliotrope, *Erica ventricosa* var. *magnifica* with surprisingly large pink flowers, the Heath-like, rose-coloured *Bauera rubioides* and *Grevillea* × *semperflorens*, which bears a succession of curiously shaped pink and buff blossoms, are a few of the less brilliant but no less desirable shrubs to be found here.

THE WAR-TIME KITCHEN GARDEN.

MAY.

Staking and Picking.—The root system of a plant serves a double purpose; the fine root hairs at the extremities absorb nourishment from the soil, and the stronger main roots anchor the plant in the ground. If the stem above ground is pulled hard, the rootlets will be broken and cease to function; it is important, therefore, that the soil round the stem should be reasonably firm and that it should remain so; as the plant increases in size there will be a greater tendency for the wind to catch and twist it so that it becomes quite loose in the ground; frost, also, loosens the soil about plants and they should be firmed in again where necessary and when conditions are favourable. This firming of the soil is particularly desirable with young plants recently transferred, and indeed with anything that is making new roots; Shallots, for instance, the bulbs of which are planted only shallowly, are frequently displaced before the roots have taken hold, with consequent damage to the growing tips; the loose skin about the neck of the bulb is sometimes pecked at by birds or drawn into the soil by worms and it is, therefore, advisable to remove it before planting the Shallots.

Taller growing vegetables want staking and it is essential to begin tying them early; the ultimate size that the plant may reach should be taken into consideration; for instance, a light cane will not support a fully-grown Tomato plant that is bearing several pounds of fruit.

The stakes for Runner Beans should be put in position early; it may be necessary to tie the young plants at first to give them a start; when they reach the top of the stakes the tips should be removed.

It is important to get Peas staked before the plants are more than two inches high so that they are properly supported from the beginning ; these sticks can be used to lay over the rows when the seeds are sown to keep off birds till the plants are up. If the supply of the usual Pea and Bean sticks is not available, some other means can probably be found of supporting the plants ; wires or string between strong uprights can be used ; coarse wire netting is excellent for Peas and string netting can be utilized in an emergency.

Dwarf Beans, though of low growth, may become unwieldy and are the better for the support of a little brushwood between the plants. Tomatos must be staked as soon as they are planted out and kept tied as they grow.

The roots of plants should also be respected when the crops are being picked ; for instance, it is unwise to tug at Peas if the stems are tough, the whole plant may be lifted. In the same way Spinach leaves are better cut off than broken ; and here the leaves should be removed regularly to keep the plants growing freely, even old leaves which are too coarse for the kitchen—they will be valuable on the compost heap. Brussels Sprouts should be picked gradually, a few at a time from each plant, starting from the bottom and working upwards, the top of the plant being left to the last.

In gathering Lettuces it is best to pull the plants up by the roots and not cut them till they are about to be used ; they will keep fresher this way.

Where the edible portion is the fruit, as with Peas, Beans, Marrows, etc., these should be picked as young as possible, that is, when fully formed but not mature ; the flavour and texture will be better, and less energy will have been expended by the plant, so that production will be continued for a longer period.

With regard to root crops, Carrots and Turnips can generally be pulled up, but may want loosening with a fork if the ground is very dry. Beetroots, however, should not be pulled, but dug up very carefully so that the skin is not broken, otherwise they will " bleed " when being cooked.

With any crop that is being grown for home use, never gather more than is wanted for immediate requirements or the value of having fresh vegetables available will be quite lost. This applies to new Potatos—dig as required, not all at once ; pull as many young Carrots, Beet or Turnips as can be used at once. Radishes should be gathered when young and crisp and not allowed to get old. Marrows, too, should be cut young, say about 9 inches long ; if any are allowed to mature for storing those developed later should be chosen, not the first fruits formed. Onions which make bulbs quickly, such as the Rocca type, should be sown specially for salad in preference to drawing upon the main crops that should come to maturity for storage. Beans that are intended for storing, such as Haricots, should not be picked green, and it is a mistake to dig Leeks in autumn, when there is plenty of variety, instead of leaving them for the winter and spring.

Work to be done.—French Beans can now be sown out-of-doors and Runner Beans towards the middle of the month. Cabbages for winter use and Broccoli and Kales for supplies in spring should be sown early ; and successional sowings made of Beetroots, Peas, Lettuce, Turnips and Kohl Rabi. Cucumbers and Marrows may be sown out of doors late in the month. Seedlings raised earlier can now be planted out, such as spring sown Cabbages, Brussels Sprouts, Cauliflowers and, at the end of the month, Celery and Celeriac. It is not too late to plant Potatos early in the month. Peas and Beans should be staked and mulched. All seedlings should be thinned as soon as they are large enough. Hoe continuously. Cauliflowers whose curds are well developed should be protected from the sun by breaking off a leaf and laying it over the curd.

Frames.—The chief use this month is to harden off plants, including outdoor Tomatos.

Greenhouse.—If Tomatos and Cucumbers are being grown under glass keep them well trained and tied as required.

Crops available from the garden in May.—Cabbages, Leeks, Lettuce, Spinach, Sprouting Broccoli. *From store :* Haricot Beans, Onions.

The Fruit Garden.—The beginning of this month is a suitable time to bark-ring over-vigorous Apples and Pears, so as to check excessive growth. Remove a strip of bark $\frac{1}{4}$ inch wide (never wider) right around the main stem of the tree. The bark is taken out right down to the wood and the wound immediately covered with grafting wax or adhesive tape. As soon as the petals have fallen from the Apples and Pears spray with lime sulphur at 1 in 100 to complete the control against Apple and Pear Scab. Control Aphides (Green-fly) with a nicotine wash. Caterpillars and other biting insects are controlled by spraying with a lead arsenate wash. Nicotine and lead arsenate are very poisonous and must be handled with care, and where it is dangerous to use them owing to nearby vegetables or other crops, use one of the non-poisonous washes instead.

If the mulching of the soft fruits has not been finished, do so as soon as possible, otherwise the soil will have become too dry. Farm-yard manure is best for mulching, but if this is not obtainable do not hesitate to use well-decayed lawn mowings, leaf-mould, spent hops, etc. Employ the hoe as often as possible between the rows to keep down weeds ; always remember that weeds rob the soil of much moisture and food. Start thinning out surplus new canes from the Raspberry stools, removing the weak ones ; this thinning ensures better canes being built up. Raspberry suckers developing some distance from the stools should be removed. Surplus new canes of autumn-fruiting Raspberries are also thinned out so as to give the new canes every chance to mature and bear fruit in the autumn. The Strawberry bed should be cleaned over before the plants begin to flower by pulling out all weeds and hoeing down between the rows. As soon as the flowers appear straw the plants by tucking wheat or

oat straw underneath the foliage and also laying some around the plants to keep the fruiting trusses clear of the ground. Finish off by netting the bed.

Where outdoor Peaches and Nectarines have set well start thinning when the fruit has reached the size of a hazel nut. When twin fruits have set leave only one, gradually reducing the fruits until they are spaced about 6 inches apart. Disbud surplus growths by removing the foreright and other badly placed ones, keeping the best placed shoots to replace the old fruiting wood at pruning time.

In the early vinery every opportunity should be taken to finish the thinning, as this will prevent a pressure of work when the mid-season vinery is ready for the same operation. When the berries start to colour provide more air, particularly on warm days, and avoid a close damp atmosphere, which is conducive neither to good colouring nor good growth. Watch the thin-skinned varieties like 'Madresfield Court' for skin cracking; with such varieties it is a good precaution against this trouble to give a little ventilation at night by means of the box ventilator. In the mid-season vinery remove surplus bunches and damp down morning and evening. As soon as the late vinery has set start damping down regularly.

Finish the thinning in the early Peach house when stoning has finished, reducing the large fruiting varieties to about 1 foot apart and the smaller fruiting varieties to 9 inches. In the later Peach houses continue to disbud and finish the first thinning.

EMBOTHRIUMS.

I HAVE read Mr. COLLINGWOOD INGRAM's note in the March JOURNAL about Embothriums, which moves me to offer the following observations of my own.

Both varieties of Embothrium mentioned in Mr. INGRAM's note were growing at Wakehurst and represented by huge specimens in 1933, when this observation was made. In that year they both flowered well and the difference in the arrangement of their flowers was very noticeable. The older form (in cultivation), known as *Embothrium coccineum*, with broader, slightly spatulate leaves, bore its flowers in terminal trusses much after the fashion of a Rhododendron. The other form, known as *E. lanceolatum*, bore its flowers in axillary clusters for a considerable part of the length of the branches. In its manner of bearing its flowers it resembles *Rhododendron racemosum*, while the other form carries its flowers in the manner of a more orthodox Rhododendron.

LEWIS PALMER.

DAVID DOUGLAS.

By F. R. S. BALFOUR, M.A., F.L.S., V.M.H.

(Continued from p. 128.)

IN the daily diary, written up at night, often without the protection of a tent, he enumerated the plants he found and described vividly and in detail all he saw and did. His journeys on the Columbia were on foot or by canoe; east of the coast range he could use horses. During the two years, from his arrival at Fort Vancouver till he reached the Rockies in April 1827 to begin his long journey across the continent, he covered no less than 7,032 miles.

In memory of DOUGLAS the State of Oregon has given his name to a peak in sight of Eugene-Klamath Falls of the Columbia. One hundred years elapsed before the first scientific explorer of those regions was thus commemorated.

In those days and for long afterwards the route taken by the "brigades" of Hudson's Bay Company men on their eastern way was up the Columbia, past the modern Revelstoke, till its junction with the Canoe River far north of the Arrow Lakes. DOUGLAS set out on March 20, 1827, accompanied by EDWARD ERMATINGER, a Hudson's Bay Company man whose narrative of the expedition has also been published. They left Fort Colville on April 19. From there to Jasper, the first post east of the Continental Divide, was 370 miles, and they reached it on May 4. They crossed the Rocky Mountains by the Athabaska Pass which lay between two peaks to which DOUGLAS gave the names of Mount Brown and Mount Hooker. By some curious error he grossly exaggerated their altitude. In the Journal as published by HOOKER, he estimated Mount Brown to be 16,000 to 17,000 feet high and "the highest yet known on the Northern Continent of America." He climbed it and was thus the first to ascend a Rocky Mountain peak. Its real height is 9,050 feet. He had botanized about the flanks of the much higher extinct volcanoes of the Cascades Range, Mounts St. Helens, Jefferson and Hood, but never records having seen the most impressive of them all, Mount Rainier, forty miles from Puget Sound which was discovered and was named by VANCOUVER while MENZIES was with him.

The route from the Athabaska Pass was to the Hudson's Bay Company post of Jasper, then onwards by boat down the Athabaska to the Fort Assiniboine. Thence to Fort Edmonton, and by the Saskatchewan River to Carlton House, in those days a well-known halting-place in the transcontinental journey. There he met THOMAS DRUMMOND who had been on a long botanical expedition on the eastern side of the Rockies, and whose journal was later published by Dr. HOOKER. By June 9 the party reached Cumberland House, where DOUGLAS found Dr. RICHARDSON, safe back from his successful expedition with FRANKLIN to the Polar Sea; then on to Norway

House at the north-east corner of Lake Winnipeg, where he also met FRANKLIN and received letters from HOOKER, SABINE and other friends.

With FRANKLIN and RICHARDSON, who were on their way home by the Canadian Lakes, DOUGLAS set off for an expedition up the Red River at the south end of Lake Winnipeg. In a week after leaving Norway House they were at Fort Alexander, where they parted, DOUGLAS proceeding to Fort Garry, the modern Winnipeg. His appearance brought a welcome from every inhabitant, more especially from the Scottish settlers, not indeed to be wondered at, as his "coat was of the Stewart or Royal tartan"! He adds, "I had many questions put to me regarding the country which they only see through ideal recollection." He received much kindness from DONALD MCKENZIE, the Governor of the Colony. He was back at Norway House by August 17, with a collection of 291 plants. DOUGLAS had much to say in his Journal of the birds he saw, most of them of the grouse tribe. His boyhood love of birds of prey induced him to bring across the continent a "calumet eagle" from Edmonton, which had been captured in the Rockies. Alas! the London Zoological Society were balked of its possession by the fatal accident that befell it at Fort York, after the 2,000 mile journey. This was the little port on the Hudson's Bay where the Company's sailing vessels arrived from England and sailed home again with their cargo of furs after the "brigades" arrived. Twenty-three years later JOHN JEFFREY also landed at Fort York in a Hudson's Bay Company vessel and travelled westwards to Jasper House by the same route.

In 1884 Dr. G. M. DAWSON commemorated DOUGLAS's crossing of the Canadian Rockies by naming a mountain of 11,017 feet, Douglas Mount, in lat. $51^{\circ} 31'$, long. $115^{\circ} 58'$, in the Red River country of Alberta.

DOUGLAS sailed on September 15, and was in Plymouth in less than a month. DRUMMOND was in the ship and records terrible weather in Hudson's Bay; DOUGLAS was ill for most of the voyage as the result of the hardships he had undergone.

THOMAS DRUMMOND, like DOUGLAS, soon returned to America to continue his botanical explorations. He met an early death in Havana in 1835, seven months after that of DOUGLAS. His name is familiar to every gardener by the Phlox which HOOKER dedicated to him in the same year.

HOOKER was at this time engaged on his *Flora Boreali-Americana*. The collections of DOUGLAS, DRUMMOND and RICHARDSON provided him with an enormous mass of new material.

At home DOUGLAS was at once lionized, and the learned Societies made him an honorary member. He worked on his Journal with a view to publication but, as I mentioned earlier, this was never finished, although the Horticultural Society offered him the profits that might result. Fourteen papers of his are enumerated in the Royal Society's Catalogue of scientific publications.

Dr. LINDLEY dedicated to him the new genus *Douglasia* of the

Primrose family, and sent to Dr. HOOKER a list of 164 species which DOUGLAS had introduced by 1827. Of these the greater proportion appeared in the *Botanical Register* and were soon to be common in gardens.

He was delighted when the opportunity came once more of sailing round Cape Horn to the Columbia. During his time at home he had been greatly helped by Captain (afterwards General Sir) EDWARD SABINE, F.R.S., the brother of JOSEPH SABINE, and had also received instruction at Greenwich, in the making of geographical observations. Not only was he again engaged by the Horticultural Society, but he received generous help from the Colonial Office in money and instruments. He embarked on October 26, 1829.

I have found a letter written by DOUGLAS to JOSEPH SABINE on October 6, 1829, twenty days before sailing, which indicated the extreme simplicity of his needs at the outset of an enterprise from which so much resulted :

"DEAR SIR,—May I beg to remind you that I shall be obliged to be allowed the sum of £40. in advance of Salary to assist me in my personal outfit. I shall be equally obliged to know if the Society will pay for my lodging or part of it. The whole sum is £24.10.0. at 5/- per week up to last Saturday. In addition to the outfit, List which was submitted for your inspection and approval, I neglected to put down a small common microscope and a sort of small box to keep my letter instructions, etc. Perhaps a leather desk or box would be the best as it would be less liable to break, if made of wood sufficiently strong to bear hard work I fear it would be too heavy. I have pretty much all that is useful for the journey, that is all for gathering plants, seeds etc. and keeping them in good order. I am still ignorant of the time of sailing or how I shall be provided for. That like everything else I must wait for. Your obedient servant, DAVID DOUGLAS."

JOHN LINDLEY, the President of the Horticultural Society, wrote in his almost undecipherable hand some days later, and says :

"Douglas has proposed to get a few more things, such as some coarse cutlery, common ironmongery, etc. to which I have assented. The charge upon these heads will be small and the articles will score for payment in lieu of Spanish dollars."

Before sailing DOUGLAS was much gratified in acquiring the first part of HOOKER's new book which contains a map with the journeys of FRANKLIN, PARRY and DOUGLAS shown in different colours. He had learned that the *William and Ann* had been totally wrecked in the previous March on the bar of the Columbia, with the loss of the whole of the ship's company of 46 people. DOUGLAS reached the Columbia in May 1830 after a month's stay in the Hawaiian Islands. The ship *Eagle*, of 193 tons, had made the voyage into the Pacific round Cape Horn without touching at any South American port ; she, like the *William and Ann*, belonged to the Hudson's Bay Company.

A curious episode was the resignation in 1830 by DOUGLAS of his employment by the Horticultural Society ; GEORGE BENTHAM

succeeded SABINE as secretary and DOUGLAS by some misunderstanding thought his friend had been slighted. He continued, however, to send his collections to the Society, instructing, as before, that part be forwarded to Glasgow for HOOKER.

Immediately after landing he ascended the Columbia but was back at Fort Vancouver by September.

All that we know after 1830 of his work in the Columbia, in New Caledonia and in California is from letters to his friends, of whom HOOKER was his principal correspondent. In October he packed three chests of seeds which went home in the *Eagle* and they included six Conifers, of which the first was *Pinus nobilis*, another was *P. grandis*, the first seed of that species to reach England. The seeds of the former resulted in plants being distributed to fellows of the Society for which as much as 15 to 20 guineas each was paid. DOUGLAS found that "an intermittent fever," probably influenza, had almost exterminated the Indians of the Columbia Valley. He himself was one of the few white men who escaped the infection.

He left the Columbia by sea before the end of 1830 and made Monterey in California his headquarters.* For nearly two years he explored the coast as far south as Santa Barbara, the Santa Lucia Mountains as well as the Sacramento Valley. He does not speak of crossing that great plain and exploring any of the lateral valleys which descend from the Sierra Nevada; had he done so he would have reaped an even richer harvest and probably found the Wellingtonia. He did collect, however, 800 species of California plants. The first he mentions is *Ribes speciosum*, which he thought as fine as any Fuchsia. He went north to within 65 miles of the southernmost point reached in his journey of the autumn of 1826. It would seem that he never saw Mount Shasta or crossed the Siskyou Range. In this letter to HOOKER of November 23, 1831, he tells of a *Taxodium*, which he calls "the great beauty of Californian vegetation." This is the first mention of the Coast Redwood by a botanist in the field. It had, however, been described and published in 1824 by LAMBERT from material brought home by MENZIES in 1795. LAMBERT's name of *Taxodium semper-virens* stood till the genus *Sequoia* was created in 1847, and its introduction took place about the same time. DOUGLAS also tells of the *Oenotheras*, *Calochortus*, *Penstemons* and many other genera of which he had collected an immense number of species; he wrote that he was certain he had "19 or 20 new genera" and 340 new species. In the same letter he tells of another Pine which he named *Pinus Sabinii*. After DOUGLAS's death Sir EDWARD SABINE claimed that the name was in compliment to himself; till now the name has been thought to be in honour of his brother, JOSEPH SABINE, as indeed it probably was. Not long afterwards he found *Pinus Coulteri*, which he named after Dr. COULTER who had joined him after botanizing in Mexico. DOUGLAS

* It is surprising that though the coast at Monterey alone is the native home of *Cupressus macrocarpa*, now the most widely planted of all *Cypresses*, it was never mentioned by DOUGLAS.

says pleasantly of him that "as a salmon fisher he is superior even to Walter Campbell, Esq. of Islay . . . besides being a beautiful shot with a rifle, nearly as successful as myself!" Dr. COULTER was working for DE CANDOLLE of Geneva.

By October 1832 DOUGLAS was back on the Columbia River. Failing a ship to take him north from California he was fain to sail all the way to the Sandwich Islands in August in a tiny vessel of 46 tons which did the voyage in 19 days. He stayed there a very short time before finding a ship to bring him back to the American coast. He had shipped the whole of his California collections home from the Islands. DOUGLAS tells HOOKER of *Pinus venusta* that he had found in the Santa Lucia mountains, south of Monterey, in March of that year. He says, "You will think I manufacture pines at my pleasure!" The *Eagle* had again reached the Pacific and brought for DOUGLAS the second and third parts of HOOKER's *Flora Boreali-Americana*.

DOUGLAS had made good use of Captain SABINE's instruction; his astronomical observations and geographical determinations when verified in later days have been found to be extremely accurate. At this time DOUGLAS had serious thoughts of proceeding to Alaska and across the Bering Sea to Siberia. Before sailing in 1829 he had hinted to HOOKER that he had an ambition to botanize on both coasts of the North Pacific. He had received a cordial invitation to go to Alaska from Baron WRANGEL, the Governor of that country, from his headquarters at Sitka. The Russian ambassador in London had made DOUGLAS and his achievements known to him. The tropical vegetation of the Sandwich Islands was, however, a countervailing impulse. He was anxious to provide materials for a work that he would have liked HOOKER to undertake on the flora of those islands.

DOUGLAS spent the winter on the Columbia largely engaged in astronomical observations, but went north into New Georgia in March where he evidently had a laborious time, doubtless in the Olympic mountains. We know little of what he saw or where he went except that he was on Puget Sound accompanied by ARCHIBALD McDONALD, a "chief trader" of the Hudson's Bay Company, who had written an account, which has been recently published, of his expedition in 1828 from Fort York to Fort Langley at the mouth of the Fraser River. DOUGLAS secured some 200 mosses and the first collection of sea-weeds of Puget Sound. Both men were at Fort Vancouver by the end of March, and then DOUGLAS set out for the most northern and inaccessible country he had yet visited. We have an account of this disastrous expedition, published in the *British Columbia Historical Review* in October 1940 and prepared after much research by Mr. A. G. HARVEY. It is sufficient here to say that the route taken by DOUGLAS was to Okanagan Lake and thence by Fort Kamloops to the Thomson and Fraser Rivers. He followed the east bank of the latter to Fort Alexandria where the horses were left. Then to Fort George and as far to the north-west as Fort St. James on Stuart Lake, 1,150 miles from Fort Vancouver. The journey was made in company with a cattle

party. DOUGLAS was tempted to continue to the coast by way of Simpson's River, now known as the Skeena, as a Hudson's Bay Company man was going to explore the route. It was followed three-quarters of a century later by the Grand Trunk Railway to Prince Rupert. However, grudging the time he would lose if he failed to reach any Hudson's Bay Company post on the coast, he decided to return as he had come, down the Fraser River. He stayed at Fort George with the Hudson's Bay officer, GEORGE LINTON, for a few days. Then he continued down stream in a frail canoe. Two days later the canoe was dashed to pieces on the Stony Islands. The men lost everything except their lives and DOUGLAS's precious instruments, his astronomical notes, charts and barometrical observations. His Journal was gone and so was his collection of 400 plants. He passed over the cataract and reached the shore in a whirlpool below. This happened on June 13, 1833. The disaster is described by DOUGLAS in his last letter of May 6, 1834, from the Sandwich Islands to HOOKER. He and WILLIAM JOHNSON returned by the way they had come from Fort Alexandria by horses to the Thomson River and Okanagan. They followed the Columbia down to Walla Walla, meeting *en route* ARCHIBALD McDONALD, his companion of the spring, who was on his way to the interior and so home on furlough. It seems DOUGLAS then made an attempt to climb Mount Hood, the flanks of which he had explored before. By September he was back at Fort Vancouver, much broken in health and spirits.

The exact site of the Stony Islands of the Upper Fraser where the DOUGLAS calamity happened has been established by the painstaking labours of Mr. A. G. HARVEY. They are "small rocky islets in what now is known as Fort George Canyon between Quesnel and Prince George." Before steamboats could pass the place in these later days the Canadian Government had to blast a channel. DOUGLAS's shipwreck was not the last to occur there. His host, GEORGE LINTON, with his wife, three children and three other persons were drowned in the Fraser shortly afterwards, almost certainly at the same place. Of WILLIAM JOHNSON, DOUGLAS's servant, it is worth recording that he was the first man to settle on the site of what is now Portland, Oregon.

At Fort Vancouver DOUGLAS met a Dr. GAIRDNER, who was a friend and student of HOOKER's, but missed another protégé of HOOKER's, Mr. TOLMIE, who had left for further north before DOUGLAS's return. He lived till old age in Vancouver's Island; his name is commemorated by TORREY and GRAY in the genus *Tolmiea* and *Saxifraga Tolmiei* of the mountains of British Columbia. DOUGLAS sailed on October 18 for the Sandwich Islands by way of California, reaching Drake's Bay in 16 days after a boisterous passage down the coast. There the ship remained for three weeks, but DOUGLAS did not do much botanizing. He did, however, climb Mount Tamalpais, near the base of which the writer of this paper saw hollow trees of *Arbutus Menziesii* of a girth of over 20 feet.

Of the last days spent by DOUGLAS on the American Continent, an

interesting sidelight has appeared by the publication in July 1933, in the *Journal of the California Botanical Society*, of a letter DOUGLAS wrote on November 11, 1833, from "At my tent on the Hill of Yerba Buena," the site of which is in the present city of San Francisco. It was addressed to his friend W. E. HARTNELL at Monterey. It is clear from it that during his previous long stay in California he had made many intimate friends, among whom were the Spanish priests at Santa Barbara.

DOUGLAS sailed from California for the Sandwich Islands on November 30, and arrived in three weeks at Honolulu. He then proceeded to the island of Maui and so to Hawaii. Of the month that followed we have, in the Journal sent to his brother John, a very detailed account of his doings. It is a lengthy document and describes the ascent of the great volcanoes, first of Mauna Kuah, then the lesser height of Kilauea, and last of Mauna Loa (or Roa), all in Hawaii, the southernmost island of the group. The last had been climbed by ARCHIBALD MENZIES forty years before and no white man or native had reached the crater before or since. MENZIES' determination of the altitude of Mauna Loa was 13,634 feet, and the Government survey subsequently made it 41 feet higher—a remarkable confirmation. DOUGLAS started within eight days of reaching the islands to make the ascent of Mauna Kuah. He reached the top after an arduous climb, first through tree ferns and other tropical vegetation, then over the roughest of lava. The height of the mountain is some 150 feet greater than Mauna Loa. The expedition took five days and he returned with fifty species of ferns as well as a good store of mosses and lichens. On January 22 he set out to climb Mauna Loa, and reached the crater in a week's time, his last sleeping place being at 10,724 feet, with a temperature of 17° F.; all natives but one had deserted him. This last of DOUGLAS's Journals is written with so much detail and in such carefully chosen and descriptive language that it is evident he had a view to its publication in the form we have it. He has much to say of the natives and their ways, and his descriptions of the volcanoes themselves are most vivid. DOUGLAS made the height of the mountain 13,517 feet, actually it is 13,675; vegetation had ceased at 11,000 feet. In April 1939 in the *Hawaiian Spectator* appeared the reprint of a letter from DOUGLAS written on February 7, 1834, to the wife of the British Consul, Captain R. CHARLTON, at Honolulu. He tells her that the volcano "is in an active state. [The crater] is twenty-seven miles round and 1,274 feet deep." In his enthusiasm he added that "one day there, Madam, is worth one year of common existence." A letter from DOUGLAS of May 3, 1834, to Captain EDWARD SABINE was published in the *Proceedings of the Royal Geographical Society* in 1834, and afterwards appeared as a pamphlet. In it he says that the woods of Hawaii are largely composed of Acacias of several species and that the natives make their canoes of them. He gave a list of the instruments he had used in his observations and sent his barometrical measurements on all the three mountains. His barometer had been made under

Captain SABINE's superintendence and he wrote with enthusiasm of the "repeating reflecting circle" with which he measured his angles. He describes a severe earthquake lasting thirteen seconds that had taken place at Byron Bay on February 17, while he was there.

The final writing from DOUGLAS's pen is his letter to HOOKER of May 6, 1834, now with the rest of the Hooker correspondence in the library at Kew. In it he says that ARCHIBALD MENZIES was remembered by the natives as "the Red faced man who cut off the limbs of men, and gathered grass." Certainly a very apt description of a botanically-minded Scottish doctor! Two months later, on July 13, 1834, DOUGLAS met his strange death. An account of it written three days after the event by his two missionary friends, JOSEPH GOODRICH and JOHN DIELL, and addressed to RICHARD CHARLTON, the Consul, was published by HOOKER in his memoir and by the R.H.S. as Appendix III to the Journal.

The story is well known but may briefly be repeated. A week earlier DOUGLAS had set off on one of his botanical expeditions in Hawaii, from Rohala Point at the extreme north end of that island. He crossed a shoulder of Mauna Loa, and had been accompanied as guide by one, NED GURNEY, a man of doubtful reputation, who had warned him of the pits dug by the natives on the paths to catch wild cattle—the descendants of those left on the island by Captain VANCOUVER. DOUGLAS's mangled body was soon afterwards found by natives in one of the pits, in which there also was a bullock. They conveyed the body many miles to the coast and it was taken to Hilo by canoe, where the missionaries saw it and wrote their report. NED GURNEY had brought down DOUGLAS's Scots terrier, his bundle, his watch, compass and money, so there seems to be no ground for a suspicion of foul play. An inquest was held at Honolulu to which the body was sent; it was buried there at Kawaiahao Church. A marble tablet was sent out from England by a Mr. JULIUS L. BRENNELLY, in 1856, who was the author of *The Cruise of H.M.S. Curacoa among the South Sea Islands*. It was placed on the face of the south-west wall of the church as the actual site of the bricked-over grave is unknown. The appropriate inscription reads as follows:—

HIC JACET
D. DAVID DOUGLAS
SCOTIA, ANNO 1799, NATUS;
QUI
INDEFESSUS VIATOR,
A LONDINENSI REGIA SOCIETATE
HORTICULTURALI MISSUS
IN HAVAII SALTIBUS.
DIE 12 JULII A.D. 1834,
VICTIMA SCIENTIAE .
INTERIIT

"Sunt lachrymae rerum et mentem
mortalia tangunt."—VIRGIL.

As the inscription was much defaced by time, in 1930 the R.H.S., at my suggestion, had this marble tablet removed to the inside of the church and they sent out for erection two bronze tablets; on one is the original inscription and English translation, on the other a record of their action. The Society thus made amends for their earlier neglect to set up a memorial to their distinguished servant. DOUGLAS's dog and instruments safely reached England. I possess his telescope of silver, inscribed as given to him by W. WELLS, Esq. The leather case also is made for a compass, doubtless the one he carried at the time of his death. The telescope I expect was left by him with his other effects in the hands of Mr. GOODRICH, the American missionary at Hilo, whose guest he had been. It reached me in 1920, from Mr. SAMUEL CROSSE, who had received it many years earlier from his friend, GEORGE DOUGLAS, the younger brother of DAVID.

W. F. WILSON in 1919 published in Honolulu a compilation of many of the particulars of DOUGLAS's life which has much helped me in the preparation of this paper.

Two portraits of DOUGLAS exist. The first is a picture 14 inches by 12½ inches, in crayon, by Sir DANIEL MACNEE, P.R.S.A., executed in Glasgow in October 1828, when DOUGLAS was visiting his old chief, Dr. HOOKER. It may be taken for certain that he it was who arranged the sitting. The picture is now in No. 1 Museum at Kew. It has a pencilled note on the back in HOOKER's writing about DOUGLAS's journeys. He added that he had sent a copy by Miss TURNER to Dr. ASA GRAY. A lithograph of this very pleasing picture was reproduced in HOOKER's *Memoir* of 1836, and a similar lithograph is the only portrait of DOUGLAS in the Linnean Society's rooms.

A small pencil drawing was made of DOUGLAS by his niece, Miss ATKINSON, in the following year, and is reproduced in the R.H.S. publication of 1914. This also was in Dr. HOOKER's possession as Sir JOSEPH sent an enlarged copy to the Secretary of the R.H.S., and expressed the hope that "it may be worth framing and hanging up."

Within two years of DOUGLAS's death a committee was formed for the erection of a monument to him in the kirk-yard at Scone. The appeal for subscriptions was in English, French and German, in parallel columns, which indicates the wide appreciation of his work among the gardeners and botanists of Europe. For practical gardeners the limit was 5s., 1s. for journeymen, 6d. from apprentices, from amateurs unlimited. The monument has a lengthy inscription which begins "Erected by the lovers of Botany in Europe in memory of David Douglas." The architectural taste of the monument is not of the kind that appeals to us to-day.

The site of the house in old Scone where he was born, alas! is not known.

In LOUDON's *Gardener's Magazine*, vol. xi, 1835, a biographical notice of DOUGLAS appeared from the pen of a friend of his boyhood, W. B. BOOTH. He expressed surprise that "in this enlightened age" the Horticultural Society had not yet published DOUGLAS's *Journal*, which he had read, and which "has been allowed to slumber in the

Society's archives in Regent Street." Seventy-nine years were to elapse before the Society did anything about it.

In the same magazine, in the following year, the Editor, J. C. LOUDON, published Miss ATKINSON's drawing of DOUGLAS, and wrote : " If we only imagine British gardens deprived of the plants introduced by Douglas, we shall find them but very little further advanced in point of ornamental productions than they were a century ago. One great advantage of the introductions of DOUGLAS, independent of their beauty, is that they are, with only one or two exceptions, not only able to stand without protection, but very hardy ; and consequently, from ripening seeds in abundance, they are calculated for ornamenting the garden of the cottager, equally with that of the prince, in Britain and the central districts of Europe."

It is fitting that a Memoir of DAVID DOUGLAS should be one of a series which it is now proposed to publish of botanical explorers. Until these latter days when we have benefited by the exploration of Western China no one had provided us with a tithe of the delightful hardy plants we owe to his intrepid journeys. DOUGLAS's finest memorial is in the woods and gardens of all of us. His collections of dried plants are divided between the Hookerian and Bentham collections at Kew, the Lindley Herbarium at Cambridge and the British Museum at South Kensington.

FURTHER NOTES ON SILVER FIRS.

SINCE the publication of my article on the Newer Asiatic Silver Firs in the November and December JOURNALS of 1941, I have been informed that *Abies Kawakamii* has, of recent years, coned more than once in the famous collection of Conifers at Kells, Co. Meath.

Regarding *Abies squamata*, a shoot has been sent to me from Western Scotland. The tree was planted in 1923 and is growing vigorously in an acid soil. This specimen is interesting because it is pubescent with dark, short, spine-like hairs, and therefore resembles the type herbarium specimens, whereas the few known trees growing in Winchester and one or two other localities are quite glabrous.

In all other respects these specimens of *A. squamata* are identical and correct in all their specific characters. This strengthens the fact that several species of *Abies* contain permanently both glabrous and pubescent individuals. All these specimens sent home by the late Dr. E. H. WILSON were raised from the same packet of seed and very kindly distributed from Dawyck.

E. L. HILLIER.



Photo N K Gould]

FIG. 50 — PRUNUS SERRULATA VAR. LONGIPES
(' Oku-Miyako ').
(See p 147)



Photo V. K. Gould

FIG. 51. *TULIPA AUCHERIANA* AT WISLEY
(See p. 148.)

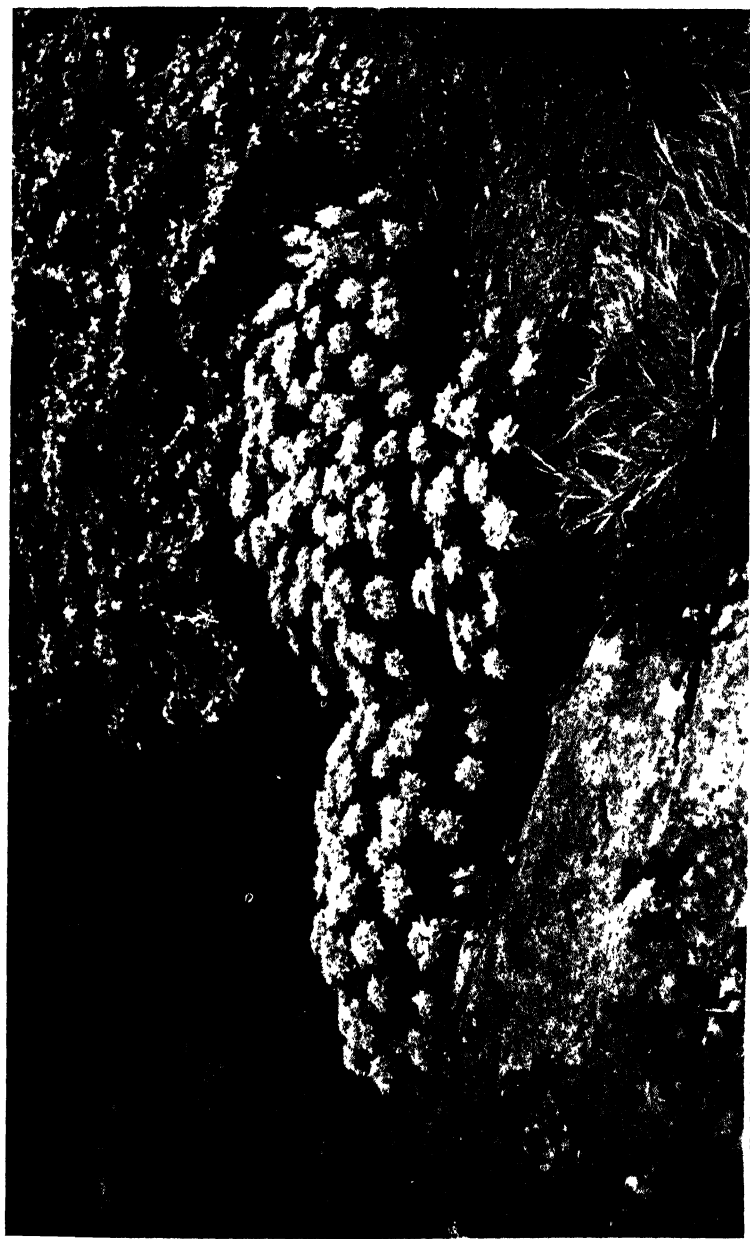


Photo N K Gould

FIG. 52 -- EUPHORBIA EPITHYMOIDES AT WISLEY
(See p. 118.)



FIG. 53. POLYGONATUM FOLIAGE ATTACKED BY THE LILY BEETLE
(See p. 166)

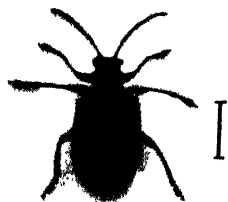


FIG. 54.—THE LILY BEETLE
(*Circulifer tenax* Scop.).
Showing natural size.



FIG 55 — VERONICA LONGIFOLIA, THE VERONICA SPICATA OF GARDENS
(See p. 170)



FIG. 50 - IRIS KAEMPFERI

(See p. 171)



Photo. F. D. Doncaster.

FIG. 57 —EDGEWORTHIA PAPYRIFLUA
(See p. 108.)

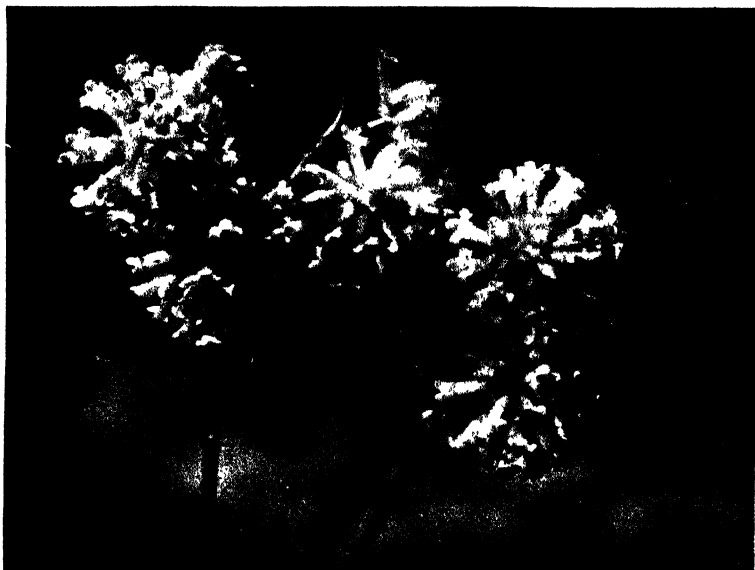


Photo F. D. Doncaster.

FIG. 58.—*EDGEWORTHIA PAPYRIFERA*
(See p. 168.)



FIG. 59.—*NEPETA MUSSINII*.
(See p. 169.)

STANDARDIZED COMPOSTS.

By J. W. BESANT.

(Keeper, Botanic Gardens, Dublin.)

THE article by Mr. LAWRENCE in the March issue of the JOURNAL is stimulating and will certainly create a greater interest in soil composts generally.

I am glad to note that Mr. LAWRENCE pays a tribute to the part played by the private garden in the past, for, undoubtedly, the whole foundation of gardening as it is to-day was laid there. The old volumes of this JOURNAL, *The Gardeners' Chronicle* and other publications show conclusively that the head gardeners of other days were men of high intelligence, shrewdness and judgment. It may be that modern methods have simplified practical operations, but no one can possibly dispute the skill shown by the head gardeners of private estates, nor the magnificent results they obtained as displayed in the great exhibitions of the past.

As to the composts used by these gardeners, I never encountered any of the weird mixtures they are alleged to have concocted in the secret precincts of the potting shed. The basic materials were loam, leaf-mould and sand. The proportions were certainly varied, more sand and leaf-mould being used for soft growing plants and less for those of a more woody nature. Further feeding when necessary was usually done by watering with liquid manure, natural or artificial, when the plants were becoming pot-bound in their final pots. So that on the whole there was nothing mysterious about the methods of the private gardeners, and they taught the young men who came under their tuition all that they themselves knew and they in turn eventually passed on that knowledge.

Now as to the John Innes composts : Mr. LAWRENCE rather throws out a challenge to botanic gardens, which, he declares, are sheltered from trade competition and public criticism. Surely the latter part of the statement is scarcely correct, since all public botanic gardens are as open to criticism as any public park, and certainly do not escape.

However, what I want to say is that the John Innes potting compost has been thoroughly tried out at Glasnevin and with very satisfactory results. So far the compost has been used for indoor plants only, including many kinds of tropical plants, hard-wooded plants, regal Pelargoniums, Cyclamens, Calceolarias and Schizanthus. In all cases the results have been satisfactory. In the case of plants grown chiefly for their flowers it was apparent that the flowers were of better substance and lasted in flower for a very long time. This was particularly the case with regal Pelargoniums and Cyclamens.

There is one result I must mention. In the case of Calceolarias and Schizanthus sown the previous summer and potted in autumn, it was found that growth seemed to be stimulated through the dark days of

winter when normally these plants would be moving very slowly. The leaves of the Calceolarias grew in size and were of a pale yellow-green; in the spring, however, they recovered and the plants developed splendidly and flowered profusely. The only criticism of the Schizanthus is that the plants grew too vigorously during winter and were too tall; this, of course, can probably be corrected by "stopping" more frequently, or later.

A small trial was also made with Tomatos. Sixteen plants were divided into two lots of eight, one lot being potted in the old compost of loam, leaf-soil and sand, the other in the John Innes compost. At first those in the John Innes compost grew away from the others, but by the time the crop was ripening there was no difference; all were grown in the same house, potted and looked after by the same man. Those in the old compost were surfaced with rotten cow manure when roots were appearing from the base of the stem: this had been the usual practice.

A further explanation is necessary. In making up the John Innes compost the proportions of loam, peat and sand were strictly adhered to. The loam was lime-free from a mountain pasture, the sand river-washed, also from a mountain district, and the peat was baled granulated peat. There was one big difference, however, from the John Innes practice—the soil was not sterilized and probably that made a difference, though I cannot see that the results could have been much better.

For some years the provision of a sterilizer has been under consideration. It was hoped to have an electric one on the lines described by Mr. JOHN RICHARDSON in the *Journal of Park Administration*, but certain of the necessary equipment could not be obtained owing to war conditions. For the same reason a high pressure steam apparatus was unobtainable, but a John Innes sterilizer is about to be built. This is on the lines of one in use here twenty-five years ago, but in that case the heating was direct and there was no water pan below the loam. It was perfectly effective however in eliminating soil pests.

One further word about lime. It will be noticed that the loam we use is lime-free, in fact it comes off granite. We always specify lime-free loam because many plants grown in botanic gardens are definitely lime-haters and it is easier to add lime than to extract it. We have always been suspicious that some Chilian and New Zealand plants do not like lime, as well, of course, as most Ericaceae and Vacciniaceae.

The John Innes compost has not yet been tried on plants like Eucryphia and Embotrium, but possibly the small amount of lime added to a compost made with lime-free loam would not be harmful.

A final word for botanic gardens. Experiments with new composts are not so easy to carry out where there is a mixed collection of plants to deal with. Many nurseries and public parks grow large quantities of a comparatively small number of different kinds of plants; at least they grow only what is ornamental or of commercial value.

In a botanic garden it would require courage to change over all at

once and pot or tub a collection of, say, temperate house plants, including rare species from Chile, South Africa, Australia, New Zealand, India and South America, of which there may be only one or two specimens of each. Likewise the succulent house containing many genera of Cactaceae, Crassulaceae, Geraniaceae, Liliaceae and Amaryllideae might be dangerous to tamper with until some trials of the various genera have been made.

So just as the old private gardeners experimented until each found his own compost, and just as Mr. LAWRENCE and his colleagues experimented until they found the John Innes compost, so must those who have to cultivate the most mixed of all collections continue to try a few at a time until it is proved that all terrestrial plants will grow to their maximum development in one standard compost.

THE LILY BEETLE, *CRIOCERIS LILII* Scop.

By G. FOX-WILSON,

Entomologist, Royal Horticultural Society's Laboratory,
Wisley, Surrey.

THE occurrence of the Lily Beetle, *Crioceris* (*Lilioceris*¹⁰) *lilii* Scop., in Surrey deserves the attention of all growers of Lilies owing to the great havoc caused by the beetles and their grubs to the foliage and flowering shoots of certain Liliaceous plants.

Specimens of the adults and larvæ were received at the Wisley Laboratory on May 25, 1940, from a Fellow residing at Chobham, Surrey, accompanied by a note to the effect that considerable injury was being done to the leaves of *Lilium regale*, *L. tigrinum* and *Fritillaria*.²

This is not the first record of this beetle in the British Isles, for spasmodic outbreaks have occurred from time to time at widely separated districts and over a period of years. FOWLER (*The Coleoptera of the British Islands*, 1887, Vol. IV, pp. 283-284) states that this species occurs "On species of *Lilium*, chiefly on the large white garden Lily; very rare; Deptford, Camberwell, Peckham, and one or two other London localities; Swansea district." The beetle reaches this country on and among imported Lily bulbs and packing material. It occurs throughout Europe as far as Asia, and in North Africa.¹

The Lily Beetle is closely related to the Asparagus Beetle, *Crioceris asparagi* L., which is a serious pest of Asparagus especially in the Home and Southern counties. The misleading statements that have appeared in the literature to the effect that the Lily Beetle will attack Onions, Garlic and Chives have arisen from mistaken identity and confusion between related species of *Crioceris*, namely, *C. lilii* Scop. (*merdigera* F.) and *C. merdigera* L. FOWLER (*loc. cit.*) states "the *C. merdigera* of Linné is a different insect, and may be distinguished by having the apex of the abdomen and part of the legs scarlet; it

appears to be found chiefly on *Convallaria majalis* (Lily of the Valley), but has also been taken on *Allium cepa* (Onion) and *Lilium martagon*."

There are marked colour differences between *C. lilii* Scop. (*merdigera* F.) and *merdigera* L.; the former having a black head, legs and underside, the latter a red head and, in part, legs and underside. Dr. K. G. BLAIR, after his attention was drawn to such statements in Continental literature, stated (in a letter dated July 23, 1941), "Hence it would seem that the records of a pest of Onions, Garlic and Chives, etc., is *merdigera* L. (*nec* F., *nec* *lilii* Scop.), and that *lilii* is not likely to attack these plants. It would probably attack *Lilium martagon*, and probably the records of *merdigera* attacking the latter and *Convallaria* are not free from suspicion of confusion between *merdigera* L. and *merdigera* F. (i.e. *lilii* Scop.)."

Food Plants.—The host plants at Chobham during 1940 and 1941 were *Lilium giganteum*, *L. regale*, *L. tigrinum*, *Fritillaria* and *Polygonatum* (Fig. 53).

FABRE,⁴ according to BLAIR, deals nominally with *merdigera* L., but as he speaks of its black head and legs it is obviously *lilii* Scop. that is intended. He found that it (presumably the adult) would eat readily *Convallaria*, *Polygonatum*, young leaves of *Smilax*, would nibble *Asparagus*, but would not touch *Ruscus*. In France, it is recorded from *Lilium species*^{1, 6} and *Solanum dulcamara*.¹¹ German authors record it from *Lilium species*, especially *L. candidum* in gardens^{8, 10} and *L. martagon*,^{5, 9} while single individuals were observed on *Convallaria* and *Polygonatum*.⁵

Description.—The adult Lily Beetle (Fig. 54), which is about $\frac{1}{4}$ inch long (6–8 mm.), is a handsome insect of a bright scarlet colour with the exception of the head, antennæ, legs and underside of the body, which are black. The eyes are prominent, and the elytra (wing-cases) are high shouldered and much broader than the thorax, which is constricted beyond the middle. The scarlet colour fades considerably after death.

The mature larva is 8–10 mm. in length, dirty yellow in colour and slightly curved. The head is dark, the legs being brownish-black, while the abdomen has small black areas regularly disposed and each provided with two bristles. The anus is situated on the dorsal area, so that the excreta accumulates above the larva, which is covered with mucilage that gives it a repulsive aspect.

The egg is 1 mm. long, and dirty yellow in colour.

Life Cycle.—The life history of *C. lilii* has not been thoroughly investigated in Britain, and the following information is based upon the observations of Continental authors, with some additional notes on the habits of the beetle as observed in Surrey.

It is generally agreed that the life cycle exceeds one year,^{1, 7, 8} and that the females are capable of ovipositing in two successive years. Statements to the effect that there are three or more generations a year have arisen from the supposition that the presence of eggs, larvæ and adults on the leaves at one time denotes multiple broods. There

is considerable overlapping of the stages of the first and second generations, and the three stages are frequently observed on the foliage for a period of four or five months.

The length of the several stages as recorded in France ⁶ and Germany ⁶ respectively are: egg, 10 days (8-10); larval, 16 days (17-24); and pupal, 20-22 days (21).

The overwintered beetles appear in France from the middle ⁷ to the end of March,¹ and in Germany ⁸ in mid-April. Pairing soon commences, followed by oviposition, which continues until early July.

Some of the later emerging beetles, which do not pair until the following spring, feed for a time and, together with others of the first generation, enter hibernation in the ground, beneath leaves, among rubbish and similar hibernacula. Mating beetles were found by HESSE ⁵ on unexpanded Lily leaves on April 26, 1932, and continued only to the end of July, after which no newly hatched larvæ were found. Female beetles which develop from eggs laid at the end of June or early July do not oviposit until the following March or April.⁷

The number of eggs laid by a single female is stated to be between 200 and 300. One female under observation was found by LATASTÉ ⁷ to lay 367 eggs between March 21 and August 24, 1931, and 160 between March 18 and April 12, 1932, when it died. The eggs are deposited in irregular groups of 3-12 on the larger leaves of the food plants, and those laid in spring give rise to adults in mid-May.¹

The larvæ feed on the leaves of their host plants, and on the flowering stems of Lilies, and complete defoliation may occur by the end of July, at which time the seed capsules are injured. When fully fed, they descend to the ground, where they pupate in earthen cells.

The last adults observed by HESSE ⁵ in Germany were on September 2, and adults were seen swarming on the leaves of *Polygonatum* at Chobham during the week commencing September 1, 1941.

Parasites.—ELLIOTT and MORLEY ³ refer to two Ichneumonids reared from *C. lili*, but BLAIR (*loc. cit.*) knows of no British records of parasites, nor has the author reared any from material collected at Chobham during 1940 and 1941.

Control.—The Lily Beetle is readily controlled by either lightly spraying the foliage of infested plants with arsenate of lead ($\frac{1}{2}$ lb. of paste to 10 gallons of water), or by dusting with nicotine dust.

With regard to these operations, the arsenical wash should be kept agitated during its application to avoid the precipitation of the arsenical particles, and the wash should be applied through a fine nozzle so that a mist-like spray is produced to form an even and thin distribution of poisonous particles over the entire leaf surface. In the case of nicotine dust, a more effective control is obtained when the application is made at temperatures above 65° F., so that the mid-day hours of a calm, warm and bright day should be chosen in preference to a cool and overcast period.

The effect on the population of the beetles by catching the adults

is outlined by LATASTE,⁷ who states that the maximum number of beetles is reached by the second generation during the period mid-May to mid-June, and that the numbers present decrease to about one-half from one year to the next. This decrease was even more marked in the case of eggs and larvæ, so that by the third year the infestation under observation had practically died out. This result was obtained by collecting and destroying the adults, allowing the larvæ to remain and be destroyed by their parasites.

It is, however, unwise to depend upon the extermination of the pest by this method in districts where larval parasites are as yet absent.

It behoves the grower of Lilies and related plants to keep a constant watch on his plants for the presence of any reddish beetles or yellowish grubs, and any material suspected of being that of the Lily Beetle may be submitted to the Royal Horticultural Society's Laboratory at Wisley for identification. The presence in nurseries and gardens of this Continental pest should be immediately reported and action taken to eradicate the outbreak, so that any widespread invasion may be avoided.

The author's grateful thanks are accorded to Dr. K. G. BLAIR (British Museum, Natural History) for information concerning this pest, and to Mr. F. C. BROWN (Wisley) for the photographs illustrating this note.

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EDGEWORTHIA PAPYRIFERA.

CLOSELY allied to the Daphnes, *Edgeworthia papyrifera* has a reputation for tenderness that may have discouraged some people from attempting to grow this attractive shrub; but it has withstood the unusually severe weather of the last few winters in a Hampshire garden, even opening its flower buds satisfactorily after 24° of frost. The bush in question is shown in Fig. 57 when, last year, it had attained a spread of 6 feet 6 inches and a height of 4 feet; this year it is larger and flowering even more profusely. This is probably one of the finest specimens in the country, so that its rather curious history will be of interest to plantmen; perhaps it indicates the treatment that the reputedly tender Daphnes want—protection of the root. *Edgeworthia*, like *Daphne*, sends its roots deep down and therefore is difficult

to move ; eight years ago this specimen was a small standard carrying but a dozen flower bunches and in the way of an extension Mr. E. D. DONCASTER was planning to his miniature mountain range at Burley ; instead of digging the plant up, he raised the rock work 3 feet round the stem and filled up with soil, rock and moraine mixture. Far from resenting this unorthodox treatment the plant proceeded to throw out a number of branches. Similar treatment given at a later date met with a similar result—it branched and flowered more freely than ever.

Edgeworthia papyrifera is a native of China, and may also occur naturally in Japan, but in that country it is extensively cultivated as the leaves are used in the manufacture of high-grade paper for currency notes. The stems are so pliable that they can be tied into tight knots without snapping and without interfering with the development of leaves or inflorescence. As in *Daphne*, the corolla is suppressed and the calyx petaloid, in shape tubular with four spreading lobes. In *Edgeworthia* the flowers are held, forty or more together, in close capitate heads, each slender bud being covered with long silky hairs from which the Cowslip-yellow, sweetly scented flowers emerge as soon as the weather permits in February or March. The name of MARIA EDGEWORTH is conspicuous in English literature ; her brother, M. P. EDGEWORTH, is less well known, but it is in honour of his work as a botanist in the East Indies that the genus was named.

AWARD OF GARDEN MERIT.—LXIV.

287. *NEPETA MUSSINII*.

Award of Garden Merit, September 23, 1935.

Nepeta Mussinii is a plant with which many gardeners are already well acquainted. It branches freely from the base ; the slender stems, square as is usual among the Labiatae, are more or less prostrate, terminating in ascending spikes of blue flowers arranged in whorls which, with the silvery colour of the small hoary crenate leaves, make a pleasant soft colour scheme. It associates well with rock work and drifts of it would be appropriate in a large rock garden, but it is rather too overwhelming for a small one ; it is excellent as an edging to a herbaceous border, especially if it forms the zone of demarcation between the bed proper and a paved path (see Fig. 59). It is beloved of cats, "who pursue the catnip as man pursues alcohol and with very much the same effect," as FARRER says ; but beyond flattening down a plant here and there they rarely do much harm. *Nepeta Mussinii* comes from the Caucasus and is hardy ; it is easily increased by seed or cuttings. The name commemorates Count A. MUSSINI PUSCHKIN, who collected in the Caucasus between 1800 and 1805. There is an illustration in the *Botanical Magazine*, t. 923.

288. VERONICA LONGIFOLIA.

Award of Garden Merit, June 15, 1935.

The plant, or rather group of plants, to which the Award has been given is more commonly known in gardens as *Veronica spicata*, though this name properly belongs to a low-growing evergreen Veronica which is more suitable to the rock garden. *Veronica longifolia* is an herbaceous perennial, varying in height in the different forms from two to four feet, its densely flowered, erect spikes making it a valuable subject for the herbaceous border. The flowers vary in colour from blue to purple, pink or white, and a number of forms have been given distinguishing names by nurserymen.

Veronica longifolia (sometimes also known as *V. maritima*) has long narrow leaves, the edge sharply serrate, in pairs or threes up the erect stems which terminate in dense flower spikes. It is a native of Europe and N. Asia. Apart from the various forms differing in colour and stature, there is the Japanese variety *subsessilis* which has larger, deep blue flowers and is a very desirable plant though not so easy to grow as the commoner forms; possibly it wants richer soil and more water. *Veronica spicata* of gardens grows well in any ordinary garden soil and increases fairly rapidly, so that clumps should be divided every two to three years. (See Fig. 55.)

289. RHODODENDRON CATAWBIENSE VAR. FASTUOSUM PLENUM.

Award of Garden Merit, July 2, 1928.

This Rhododendron, commonly known as *R. fastuosum flore pleno*, is probably a hybrid between *R. catawbiense* and *R. ponticum*, the two species which have given rise to the series of fine hybrids flowering in May and June. *R. ponticum*, from Spain and Portugal, introduced in 1763, is now one of the commonest of our evergreens, but the hybrids raised from it are generally less useful and less hardy than those of *R. catawbiense*; the latter grows freely on the slopes of the mountains of the south-eastern United States and was introduced to this country in 1809; it is distinguished from *R. ponticum* by the broader leaves and more restrained habit of growth.

The hybrid to which the Award has been made has semi-double flowers, generally having the appearance of one corolla within another rather than the collection of shapeless petals that sometimes results from doubling; in colour it is a pleasant lilac purple and the round trusses are shapely and attractive. One merit of this plant is that it is quite hardy and does not object to an exposed position.

290. RHODODENDRON VISCOSUM.

Award of Garden Merit, October 4, 1937.

Rhododendron viscosum, the parent of many of the garden Azaleas, was introduced to cultivation early in the eighteenth century and is

especially valued for its delicious fragrance and the late period at which its flowers are produced—June and July. It is a deciduous shrub with ovate leaves, glabrous on both sides, the upper side being darker coloured than the lower. The flower clusters consist of from four to nine blossoms, the calyx and tube of the corolla being covered with sticky hairs, hence the name; the flower is white or pale pink, about 1½–2 inches across. This *Rhododendron* comes from Eastern North America, especially the swamps of Maine and Carolina, its common name being Swamp Honeysuckle. It is hardy and will do well in any situation that suits the moisture-loving types of *Rhododendron*. Although in 1836 LODDIGES gave ten varieties in his catalogue, the hybrid Azaleas of to-day do not show much sign of their *viscosum* parentage, but one or two of the early varieties can still be obtained under their original names.

291. IRIS KAEMPFERI.

Award of Garden Merit, July 18, 1938.

Iris Kaempferi is the name usually accorded in gardens to the beautiful Japanese Irises; it is, however, doubtful if *I. Kaempferi* is a distinct species or merely a varietal form of *Iris laevigata*, from which it differs by having a very pronounced ridge down the centre of each leaf. The species appears to be variable and capable of producing a number of different floral forms by selection, for the Japanese Irises now cover a very wide range both in shape and colouring, though there has been no hybridization with any other species. The type is characterized by having wide showy falls with small, relatively short, erect standards; but in some forms the standards resemble the falls so that the flower consists of six wide, spreading petals; in size the flowers may be as much as 10 inches across. The colour range is from pure white through blue to dark purple, either plain or variously marked and patterned; there are a large number of named varieties.

Japanese Irises grow to a height of 2 to 3 feet, making strong clumps bearing in June and July several flowering stems; they will not tolerate shade and should be given a sunny position, but the soil must be moist; the ideal situation is beside a stream or pond, where they will be most decorative, but those who have no water in their garden may yet enjoy the beauty of the Japanese Iris if the soil contains plenty of water-retaining material. Propagation by division is possible in early autumn, or by seed in spring; the plants reach flowering size in two years. Suitably planted Japanese Irises are shown in Fig. 56.

REPORT FOR 1941 ON TRIALS OF HARDY FRUIT FOR COMMERCIAL PURPOSES.

By J. M. S. POTTER, N.D.H., Fruit Trials Officer.

THE area of the trial grounds and their arrangement remains as it was at the time of the last report; twenty-three acres are occupied by fruit under trial, with an additional sixteen acres occupied by the standard collections of varieties of all kinds of hardy fruits and with the nursery.

The Joint Committee of the Royal Horticultural Society and Ministry of Agriculture met at Vincent Square on April 22, 1941.

Since the publication of the last report the following variety has been accepted for trial:

Strawberry.—Seedling from The Director, John Innes Horticultural Institute, Mostyn Road, Merton, S.W. 19.

The following varieties have been received for adding to the standard collections:

Apples.—‘Astrachan White,’ ‘Beauty of Kent,’ ‘Benoni,’ ‘Claygate Pearmain,’ ‘Crawley Reinette,’ ‘Crimson Bramley,’ ‘Curl Tail,’ ‘Duchess of Gloucester,’ ‘Forester,’ ‘Green Costard,’ ‘Lady Sudeley,’ ‘Hounslow Wonder,’ and ‘Paul’s Winter Hawthornden.’

Plums.—‘Admiral,’ ‘Bastard Victoria,’ ‘Braby’s Greengage,’ ‘Curlew,’ ‘Chabot,’ ‘Early Favourite,’ ‘Guthrie’s Late,’ ‘Lawson’s Golden Gage,’ ‘Mayhard,’ ‘McLaughlin’s Gage,’ ‘Princess Elizabeth,’ ‘Quetsche d’Allinger,’ ‘Reine Claude de Bavay,’ and ‘Wyedale.’

Strawberry.—Seedling.

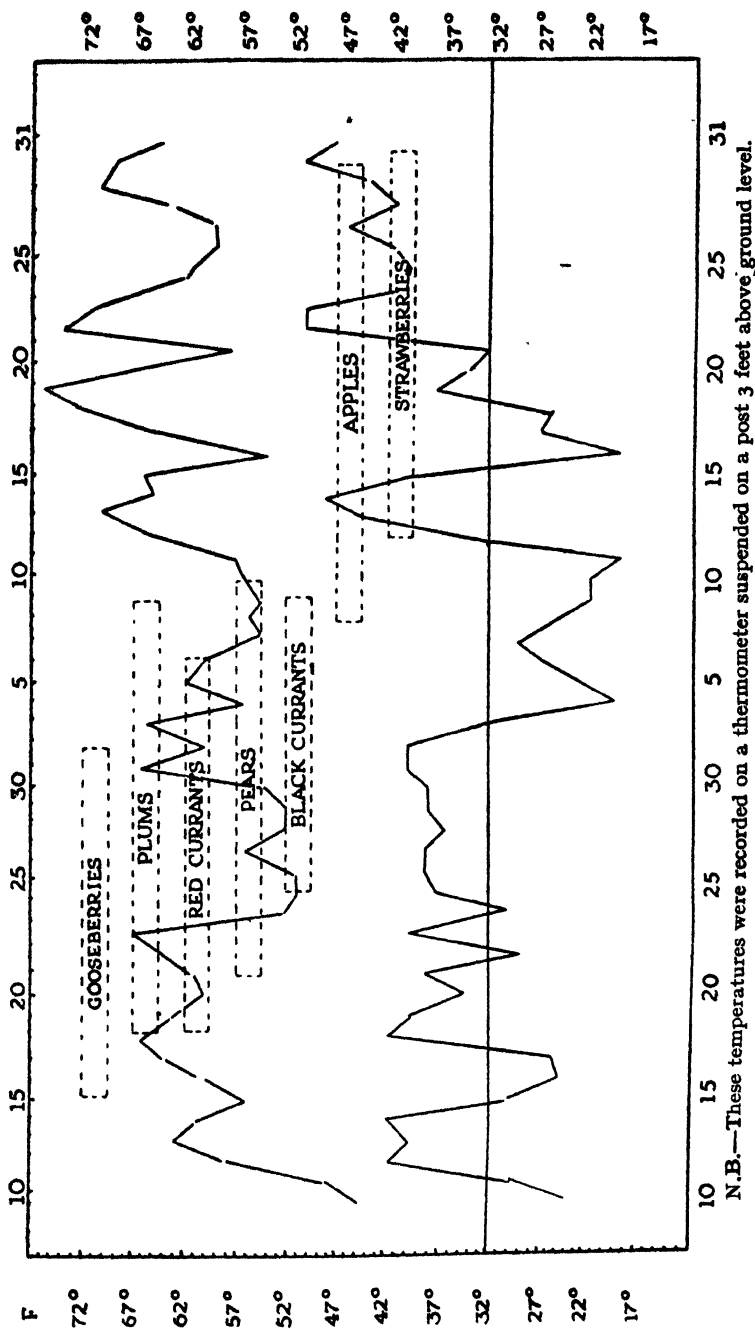
The 1941 season has been a most unfavourable one. The cold spring delayed the flowering period of all kinds of fruit, but the severe frosts experienced during May seriously damaged what promised to be an excellent fruit season. The chart on p. 173 illustrates the maximum and minimum temperatures during the flowering period of the different kinds of fruit.

Apart from illustrating the maximum and minimum temperatures during the flowering period, the chart also illustrates two other interesting factors: (1) That the flowering period of all kinds of hardy fruit covered a period of about seven weeks only, and (2) The comparatively short flowering period of each kind of fruit.

The following notes summarize the frost damage to each kind of fruit and the cropping of those which were only partially damaged at the flowering period.

APPLES.

The frosts occurring during the later part of April and the beginning of May did little damage to the Apple flowers, although a few blossoms on the early flowering varieties, which had reached the green bud stage, were injured on May 7, when 13° F. was recorded. Owing to



the subsequent cold nights the flowers developed slowly, and more damage was done on the night of May 11, when the temperature again dropped to 19° F. Taking all varieties together at this period, a rough estimate of the damage done would be that at least half the flowers were killed. From May 12 to 15 the temperature increased, bringing many varieties into full flower, with the majority of the others at the pink bud stage. On the night of the 16th the temperature again dropped to 19° F., and this destroyed the prospect of an average crop, because many varieties such as 'Bramley's Seedling,' 'Newton Wonder,' 'Lane's Prince Albert,' 'A. W. Barnes,' 'Alderman,' and 'Sowman's Seedling' had every remaining sound flower destroyed.

There were, however, a few varieties which carried heavy crops despite damage at the flowering period, and judging from the 1941 spring conditions, some varieties certainly prove less susceptible to frost injury than others. The following lists indicate: (1) those varieties which were only partially injured by frost and carried heavy crops, (2) those which were seriously injured and only yielded light crops, and (3) those which had all their flowers more or less destroyed.

Group 1.

'Crawley Beauty'
'Ellison's Orange'
'Cutler Grieve'
'Red Coat Grieve'
'Ontario'
'Wagener'
'Laxton's Epicure'
'Woolbrook Pippin'
'Opalescent'
'Worcester Pearmain'
'Melba'
'Stonetosh'
'Laxton's Triumph'
'Laxton's Superb'

Group 2.

'Lord Lambourne'
'Edward VII'
'Monarch'
'Millicent Barnes'
'Beauty of Bath'
'Maidstone Favourite'
'George Carpenter'
'Thorpe's Peach'
'Patricia'
'Taunton Cross'
'Gloucester Cross'
'King of the Pippins'
'Early Victoria'
'St. Cecilia'

Group 3.

'Bramley's Seedling'
'Newton Wonder'
'Lane's Prince Albert'
'Encore'
'Peter Lock'
'A. W. Barnes'
'Alderman'
'Sowman's Seedling'
'Ecklinville'
'Woolbrook Russet'
'Cox's Orange'
'Herring's Pippin'
'Seabrook's Red'
'Blenheim Orange'
'Cottenham Seedling'

The following observations on frost injury, which may be interesting, were recorded:

1. That dessert varieties on the whole appear to be more resistant than culinary varieties, as can be seen from the foregoing lists.

2. That the most susceptible stages appeared to be at the green bud stage, where the injury was usually found to be at the union of the pedicels and not to the sex organs, and at the open blossom stage, when the pistil was invariably killed. The pink bud stage showed some degree of resistance as compared with the two other stages.

3. Any blossoms which escaped injury were usually situated on the underside of flower clusters.

4. That trees on Malling type XII were more susceptible than trees of the same variety on Malling type I and II.

5. Late keeping varieties were on the whole more severely damaged than the early and mid-season varieties.

6. Young trees appeared to be more susceptible than fully grown trees.

Nothing can be reported about the behaviour of the newer varieties as practically in every case the flowers on the young trees were killed. Amongst those which cropped and about which previous reports and descriptions have been given, the following are worthy of note.

'*Melba*.'—Cropped and sold well, and despite its softness was preferred by the retailers to 'Beauty of Bath' or 'Maidstone Favourite.'

'*Laxton's Epicure*.'—Cropped as heavily as any variety this year, and its popularity amongst retailers and visitors to the trial grounds remains second to 'Cox's Orange.'

'*Laxton's Fortune*.'—A few fruits were obtained from the young trial trees and the quality of these was good. If this variety proves to be a good cropper, and it is showing promise in this respect, there is every possibility that it will prove a serious rival to 'Worcester Pearmain.' Statements have been made, other than from the trials, that 'Fortune' will keep until Christmas. These statements should be deprecated as the proper season is September to October.

'*Laxton's Triumph*.'—A variety with a season from November to January. Not unlike 'Cox's Orange' in shape but not so well coloured and possessing more russet. The flavour is excellent but the flesh is rather tough.

'*Wagener*.'—A well-known American variety which will keep in a natural store until March.

The only cooking varieties the behaviour of which is worth recording this year are 'Ontario,' a late keeping variety of North American origin, and 'Crawley Beauty,' which produced a very heavy crop as it was only slightly damaged at the flowering period.

PEARS.

All prospects of a Pear crop from the trial grounds were destroyed by the frosts recorded on May 4 and 11. It is interesting to note here that a good crop was obtained from some varieties in the Pear orchard on the hill in the Gardens. The minimum temperature recorded at the Meteorological Station situated just above this orchard is usually one or two degrees above that of the fruit trial grounds, and this rather indicates that there is a marked limit of frost which Pear flowers will withstand and beyond that limit all flowers are killed.

PLUMS.

Most varieties of Plums flowered and set, but the frosts on the 4th and 11th and finally on May 16 killed all the fruitlets.

GOOSEBERRIES.

Gooseberries also set well, but the fruit was killed on the 16th, and the only varieties which produced a few berries were 'Green Gem' and 'Leveller.'

RED CURRANTS.

Red Currants again showed that they were not so susceptible to

frost damage as the other soft fruits and a light crop was picked from most varieties, particularly 'Laxton's No. 1,' 'Wilson's Long Bunch,' and 'Earliest of Fourlands.'

STRAWBERRIES.

Only a few of the Strawberry flowers were open on May 16, but these were killed, together with a number of the flowers at the green bud stage. Despite this a good crop was obtained, and the outstanding new varieties were as follows :

'*Corvallis*.'—A North American variety about which previous reports have been issued. The plants are still maintaining their health and vigour, and although the fruit is small it is a prolific cropper.

C.C. 44.—One of the seedlings received from the West of Scotland Agricultural College. Fruit is not unlike 'Royal Sovereign' in shape, but a little darker in colour. Flesh is firm and possesses an excellent flavour. Plants moderately vigorous, but of a heavy cropping habit.

C.C. 18.—Another seedling from the same source as above, but it does not possess as good a colour as C.C. 44, and the flavour is not quite as good. Of medium vigour and a heavy cropper.

'*Redbourn*.'—This variety still continues to grow vigorously, but the crop bears no relation to the size of the plant, as the yield is only moderate. Fruit is not unlike that of 'Huxley Giant' and of no better flavour.

Fuller details of new varieties of Strawberries and the method of cultivation were given in the R.H.S. JOURNAL, 1940, pp. 183 and 256.

RASPBERRIES.

The primary buds on the Raspberries were killed on May 16, but secondary buds developed and these produced fruiting trusses of a size below normal. This made it impossible to describe the true fruiting habit of any of the new varieties, but judging from the quality of the fruit of certain of the seedlings raised at the Research Station at East Malling, these show promise of being equal to, if not better than, many of the standard varieties. All these seedlings are vigorous with one exception, and up to the present show little sign of Mosaic.

BLACKBERRIES.

Amongst the Blackberries the outstanding new variety was 'Merton Early.' This produced a heavy crop of good firm shiny black fruit, which possesses a better flavour than most of the cultivated varieties. It is, however, not a particularly strong grower. 'Bedford Giant' and 'Himalayan Berry' again cropped heavily.

DAHLIAS AT WISLEY, 1941.

TWO HUNDRED AND SIXTY varieties of Dahlias were included in the trial at Wisley; of this number sixty-one varieties had been selected for trial by the Joint Committee of the Royal Horticultural Society and the National Dahlia Society in 1940. The remainder were grown for comparison, as most of these had received Awards in former years.

The report records the awards recommended by the Joint Dahlia Committee, who inspected the trials on September 9, 1941, and indicates the classes to which the new varieties were assigned; it also mentions those varieties retained for further judgment and those discarded.

The National Dahlia Society did not award a Gold Medal in 1941.

SINGLE.

The following variety has been discarded: **MODESTY**.

SMALL-FLOWERED PAEONY.

The following variety has been retained for future judgment: **JOHN JAMES** (Treseder).

The following varieties have been discarded: **OUR MARY**, **TOKEN**.

DWARF SMALL-FLOWERED PAEONY.

The following varieties have been discarded: **CHARLOTTE** (Dobbie), 3/938 (West), **SYLVIA SLADE** (Slade).

LARGE INFORMAL DECORATIVE.

John Green (raised and sent by Messrs. J. Stredwick and Son, Silverhill Park, St. Leonards-on-Sea). **A.M.** September 9, 1941.—Described **R.H.S. JOURNAL**, 64, part 3, p. 140. (**H.C.** 1938.)

Golden Eagle (raised and sent by Messrs. J. Stredwick and Son). **H.C.** September 9, 1941.—4½ feet; of compact habit. Flowers 6 to 7 inches diameter; at tips Lemon Yellow (**H.C.C.** 4), toning to Shrimp Red (**H.C.C.** 616) on a yellow ground; free and erect, on 9- to 16-inch stalks, well above the foliage.

Royal Oak (raised and sent by Messrs. J. Stredwick and Son). **H.C.** September 9, 1941.—4 feet; of compact habit. Flowers 6 to 9 inches diameter; Saffron Yellow (**H.C.C.** 7/1) on a Canary Yellow (**H.C.C.** 2/1) ground, centre florets of a deeper tone; petals channelled and somewhat twisted; free and erect, on 9- to 16-inch stalks, well above the foliage.

Vanity Fair (raised by J. Foulkes, Esq., introduced and sent by Messrs. J. Cheal and Sons, Ltd., Crawley, Sussex). **H.C.** September 9, 1941.—4 feet; of compact habit. Flowers 6 to 7 inches diameter; very bright scarlet; free and erect, on 7- to 12-inch stalks, well above the foliage.

Winston (raised and sent by Messrs. J. Stredwick and Son). **H.C.**

September 9, 1941.—4½ feet ; of compact habit. Flowers 7 to 9 inches diameter ; deep rich glowing scarlet ; very free and erect, on 5- to 7-inch stalks, well above the foliage.

The following varieties have been retained for future judgment : **BRENDA CORRY** (Brown and Such), **FULMAR** (Brown and Such), **SEEDLING XI.A. 1** (Spencer), **SEEDLING XVIII.A. 3** (Spencer).

The following varieties have been discarded : **ELIZABETH M. GRIER** (Torrance and Hopkins), **SEEDLING 134/938** (West), **SIR KINGSLEY** (Stredwick).

MEDIUM INFORMAL DECORATIVE.

Lutine (raised and sent by the late Mr. J. T. West, Tower Hill, Brentwood, Essex). **H.C.** September 9, 1941.—4 feet ; of compact habit. Flowers 4½ to 5 inches diameter, deep rich rosy-crimson at margins, middle of florets whitish, tips white ; very free and erect, on 9- to 14-inch stalks, well above the foliage.

The following varieties are retained for future judgment : **ETHEL BANBERY** (Stredwick), **GLORY OF DULWICH** (Griffiths), **SEEDLING XII.A. 1** (Spencer).

The following varieties have been discarded : **GLAMOUR** (Stredwick), **SEEDLING 124/938** (West), **TEMPO** (Carlée), **TONE** (Spencer).

SMALL INFORMAL DECORATIVE.

Enfield (raised and sent by Mr. J. F. Barwise, Towneley Nurseries, Burnley, Lancs.). **H.C.** September 9, 1941.—4 feet ; of compact habit. Flowers 4 to 5 inches diameter, a tone of Orange (**H.C.C. 12/1**) ; very free and erect, on 6- to 11-inch stalks, well above the foliage.

Faithful (raised and sent by Mr. J. F. Barwise). **H.C.** September 9, 1941.—4 feet, of compact habit. Flowers 4 to 5 inches diameter, a tone of Geranium Lake (**H.C.C. 20/2** and **20/1**), base of florets pale yellow ; free and erect, on 8- to 15-inch stems, well above the foliage.

Pandora (raised and sent by Mr. J. F. Barwise). **H.C.** September 9, 1941.—4 feet, of compact habit. Flowers 4 to 5 inches diameter, a tone of Geranium Lake (between **H.C.C. 20/2** and **20/1**), base of florets Buttercup Yellow (**H.C.C. 5/2**), inner florets of a darker tone ; very free and erect, on 4- to 8-inch stalks, well above the foliage.

Pink Lady (raised and sent by Messrs. Dobbie & Co., Ltd., Edinburgh). **H.C.** September 9, 1941.—3½ feet ; of compact habit. Flowers 4 to 4½ inches diameter, Fuchsine Pink (**H.C.C. 627/2**), base of florets pale lemon ; free and erect, on 9- to 14-inch stalks, well above the foliage.

The following varieties have been retained for future judgment : **BATTLE** (Brown and Such), **BUFFALO** (Brown and Such), **DENNIS** (Treseder), **DERWENT** (Barwise), **MING** (Stredwick), **ORANGE GLORY** (Wallis), **ORANGEMAN** (Barwise), **PINK BEAUTY** (Wallis), **SEEDLING VII.A. 1** (Spencer).

The following varieties have been discarded : **EDWARD MASTERS** (Treseder), **FRIAR'S CRAIG** (West), **MASCOT** (Stredwick), **SEEDLING XIII.A. 1** (Spencer), **TOWNELEY BEDDER** (Barwise).

DWARF INFORMAL DECORATIVE.

The following variety has been retained for future judgment : **CRAIGPARK PINK** (Torrance and Hopkins).

The following varieties have been discarded: AUTUMN BEDDER (West), 29/938, 53/938 and 65/938 (West).

SMALL-FLOWERED FORMAL DECORATIVE.

The following varieties have been discarded: HODDER (Barwise), LITTLE JEAN (West), PICKET (Stredwick).

DWARF SMALL-FLOWERED FORMAL DECORATIVE.

The following variety has been discarded: 68/938 (West).

SHOW.

The following variety has been retained for future judgment: MAGISTER (Brown and Such).

POMPON.

Rifeman (raised and sent by Messrs. W. Topsvoort, Aalsmeer, Holland). A.M. September 9, 1941.—Described R.H.S. JOURNAL 66, part 1, p. 38. (H.C. 1940.)

Bonny (raised and sent by Messrs. J. Stredwick and Son). H.C. September 9, 1941.—4½ feet, of compact habit. Flowers 2½ to 2¾ inches diameter, Primrose Yellow (H.C.C. 601/2), tips of florets a tone of Mandarin Red (H.C.C. 17/1), inner florets of a deeper tone on the tips; very free and erect, on 6- to 8-inch stalks, well above the foliage.

Martlet (raised by Messrs. Brown and Such, Ltd., Maidenhead, Berks.). H.C. September 9, 1941.—3¾ feet, of compact habit. Flowers 2½ inches diameter, a tone of rosy-scarlet, tips of florets pale yellow; free and erect, on 4- to 8-inch stalks, well above the foliage.

Purple Gem (raised and sent by Mr. J. F. Barwise). H.C. September 9, 1941.—3½ feet, of compact habit. Flowers 2 inches diameter, rich royal purple; free and erect, on 8- to 12-inch stalks, well above the foliage.

The following varieties have been retained for future judgment: CAPRICE (Stredwick), DRAGONFLY (Stredwick), HONEYWELL (Barwise), LOVABLE (Stredwick), RADIANT (Wallis).

LARGE SEMI-CACTUS.

Boston (raised and sent by Messrs. Brown and Such, Ltd.). H.C. September 9, 1941.—6 feet, of compact habit. Flowers 6 inches diameter, white, base of florets greenish; free and erect, on 8- to 15-inch stalks, well above the foliage.

Dunraven (raised and sent by Messrs. W. Treseder, Ltd., Cardiff). H.C. September 9, 1941.—4½ feet, of compact habit. Flowers 5 to 6½ inches diameter; Fire Red (H.C.C. 15/2), faintly suffused with light rose; free and erect, on 6- to 10-inch stalks, well above the foliage.

The following varieties are retained for future judgment: DR. JACK (Treseder), HURRICANE (Brown and Such, Stredwick), MISS WADGE (Treseder), No. 16 (Stredwick), RUSTY BILL (Treseder).

The following varieties have been discarded: FRAU O'BRACHT (Ballego), G. J. MENDEL (Carlée).

MEDIUM SEMI-CACTUS.

Queen Marjorie (raised and sent by Mr. J. F. Barwise). **H.C.** September 9, 1941.—4 feet, of compact habit. Flowers 5 to 6 inches diameter; Carmine Rose (**H.C.C.** 62/1) on a light orange ground; free and erect, on 6- to 9-inch stalks, well above the foliage.

The following variety has been retained for future judgment: **XII.A.** 3 (Spencer).

The following varieties have been discarded: **PRECIOUS** (Barwise), **TOMAHAWK** (Brown and Such), **JENNIE** (Treseder).

SMALL-FLOWERED SEMI-CACTUS.

Bessie (raised and sent by Mr. J. F. Barwise). **H.C.** September 9, 1941.—3½ feet; of compact habit. Flowers 4 to 5 inches diameter; at tips of florets Solferino Purple (**H.C.C.** 26), toning to scarlet at orange base; free and erect, on 6- to 9-inch stalks, well above the foliage.

The following varieties have been retained for future judgment: **III.A.** 3, **III.A.** 4 and **III.A.** 5 (Spencer).

The following varieties have been discarded: **HAPPINESS** (Brown and Such), **V.A.** 1 (Spencer).

DWARF SEMI-CACTUS.

The following variety has been discarded: **PETER PAN** (Wallis).

CACTUS.

Television (raised and sent by Messrs. J. Stredwick and Son). **H.C.** September 9, 1941.—6 feet; of compact habit. Flowers 6 to 7 inches diameter; Sulphur Yellow (**H.C.C.** 1/2), suffused with deep dull rose; free and erect, on 9- to 15-inch stalks, well above the foliage.

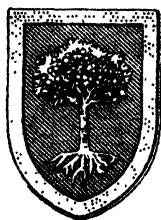
BOOK REVIEW.

"English Woodland." By John Rodgers. 8vo. xii + 132 pp. Ill. (B. T. Batsford Ltd., London, 1942.) 10s. 6d.

This is a book for the lover of trees, or perhaps more particularly of woodlands rather than of individual specimens. After a general introduction it takes the reader through England, dealing district by district with the forests that still remain, often with the scattered woodlands that stand for what once was a forest. Of Wychwood, Sherwood, even Arden little remains, and of course many areas called forest, such as Ashdown and Wolmer, and again to a large extent the New Forest itself, were open heaths with trees only in the sheltered spots with water near. The author has gathered together the main features of the history belonging to each forest or woodland area, and is liberal in his quotations from the long succession of English writers from Drayton to Edward Thomas who have rejoiced in what was left of the earliest England. The illustrations are delightful, and if one misses some well-beloved spot of one's knowing, most readers will be moved, to note down this or that wood that they must see if ever they are within reach.

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June 1942

THE SECRETARY'S PAGE.

Monthly Shows.—A Show will be held on June 16 (12 noon to 6 P.M.) and 17 (10 A.M. to 5 P.M.), at which the Iris Society will also be exhibiting. The Society's second competition for amateurs for flowering shrubs will take place, and particulars and entry forms can be obtained on application to the Secretary.

The July Monthly Show will be held on July 14 (12 noon to 6 P.M.) and 15 (10 A.M. to 5 P.M.), at which the National Carnation and Picotee Society, the British Delphinium Society and the National Sweet Pea Society will co-operate. On this occasion of the July Show there will be some classes for Lilies, particulars of which can be obtained from the Secretary. There will be also a competition for the Clay Challenge Cup offered to the raiser of a Rose of good form and colour, not in commerce before the current year, and possessing the true old Rose scent. Further particulars may be obtained from the Secretary.

Demonstrations at Wisley.—On June 3 and 4, from 2 to 4 P.M., there will be a demonstration in the Flower Garden on Summer Pruning of Shrubs. On July 15 and 16, from 2 to 4 P.M., there will be a demonstration on Summer Pruning of Fruit Trees in the Fruit Garden. Would Fellows and their friends intending to attend kindly inform the Director of the Gardens so that arrangements may be made.

Distribution of Plants and Seeds.—The Council would like to thank those Fellows who so kindly complied with its request to return all the boxes used in the plant distribution. The return has been very encouraging and will be of great assistance in next year's distribution.

Seeds for Prisoners of War.—Grateful thanks are due to the many

Fellows who have contributed towards the carrying on of this work. The following postcard has been received and will be read with interest:

DEAR SIRS,—We are very grateful for the Seed Parcels Nos. 14—63—155 which we received, and are making great efforts to produce some wonderful specimens. If advice from onlookers is to be of help we estimate to startle ourselves even. Yours faithfully, E. R.

The Society's Publications.—The popularity of "The Vegetable Garden Displayed" is still maintained and the fourth impression has been so far bespoken that steps are being taken for a fifth impression; the price now is 2s. post free.

The subscribers to Volume I of the Horticultural Colour Chart have responded very well in ordering the second volume also. There are still some subscribers who have not indicated whether they would like Volume II, and the Secretary would be pleased to hear from them; also from any other Fellow who requires the Chart. The prices are as follows:

To Fellows of the Society:

Volume I—11s. post free.

Volume II—12s. 6d. post free.

To non-Fellows of the Society:

Volume I—22s. post free.

Volume II—22s. post free.

Rose Show.—The National Rose Society will be holding a Show in the Society's Old Hall on July 3, from 12 noon to 6 P.M. Fellows tickets admit free. The autumn show will be held on September 18. Further particulars may be obtained from The Secretary, National Rose Society, 117 Victoria Street, London, S.W. 1.

WISLEY IN JUNE.

THE unusually long periods of April sunshine, together with an almost total freedom from frost rarely enjoyed at Wisley, assisted this year in a production of blossom well above the average in both quality and quantity. Seldom have the Japanese Cherries or the Forsythias been so heavily laden, and several seasons may pass before so great a variety of early-flowering Rhododendron species again display their delicate flowers. There is good reason to hope that the June-flowering trees and plants will provide an equally abundant and varied show.

During this month the Trials and collections of herbaceous plants are one of the most interesting features of the Gardens. The collection of Lupins embraces modern varieties of all possible hues, and this is also true of the Iris collection. The best of these are planted in the ground opposite the Peach wall, where they gave a memorable performance last year, some of the newer yellow sorts being particularly outstanding. Some of the favourites of thirty years ago, however, still have their admirers, and many of them, such as the quaint little 'Gracchus' and slender 'Madame Chereau,' are still living in retirement on the Hill. The popular Delphinium, 'Pink Sensation,' and varieties of the 'Belladonna' type will be in bloom before the end of

the month, and the Roses will have begun their long flowering season. Visitors will find a visit to Battleston Hill worth while, to see the later species and varieties of *Rhododendron*.

Rock garden enthusiasts will find much to please them both in the Alpine house and outside. In the house, the long, arching sprays of varieties of *Saxifraga Cotyledon* make a pretty background for Campanulas such as *C. bellidifolia*, *C. petrophila* and *C. × kewensis*; the prettily striped flowers of *Lewisia Heckneri*, *L. Howellii* and other species are still in evidence, and rich colour is supplied by *Ramondia Myconii*, *Rhodohypoxis Baurii* and the shrubby, rose-hued *Gilia californica*. Other plants worthy of note are *Weldenia candida*, like a glorified, white-flowered *Tradescantia*, *Phlox mesoleuca*, *Phyteuma comosum* and *Geranium argenteum*.

Among the many genera at the height of their beauty in the Rock Garden, *Dianthus*, *Geranium* and *Phlox* are conspicuous, and other striking plants are *Lychnis Arkwrightii*, *Genista lydia*, a most floriferous and desirable small shrub, and *Rhododendron indicum* var. *balsaminaeflorum* forming hummocks of double pink flowers. On sunny days the prostrate *Anacyclus maroccanus* covers itself with dazzling white Daisies (see Fig. 61). By the waterside, *Iris laevigata* sets a high standard of colour and form for the varieties of *I. Kaempferi* soon to follow.

Primulas of the Candelabra section are a prominent feature of the Wild Garden. In addition to *P. japonica*, naturalized along the ditches and on cool banks, there are *P. pulverulenta* and its attractive pink forms, tall, golden-tiered stems of *P. helodoxa*, the slender red and yellow *P. chungensis* and the notable hybrid 'Chunglenta' (*P. chungensis* × *P. pulverulenta*). *Lilium rubellum* has long been established and grows vigorously in several places, and other early species are *L. Szovitsianum* and the unpleasantly scented *L. pyrenaicum*.

Some first-class shrubs which appreciate woodland conditions are *Kalmia latifolia*, with large clusters of delicate pink cups, the compact, small-leaved variety *myrtifolia*, the darker rose-coloured *K. angustifolia*; *Magnolia Sieboldii* with crimson-centred saucer-shaped flowers half hidden among pale leaves, and the larger-flowered *M. Watsonii*, remarkable for its strong, far-spreading perfume. Two other almost indispensable shrubs for all except the smallest garden are *Genista cinerea*, which regularly covers itself with fragrant golden flowers, and *Buddleia alternifolia*, which has drooping, lavender sprays a yard long. Very fine specimens of these grow in Seven Acres, where at the present time many species and varieties of *Philadelphus*, *Deutzia*, *Escallonia*, *Cotoneaster* and *Berberis* are at their best.

Near the Pinetum bridge is a collection of the newer hybrid Lilacs, many of which have been raised by Miss Preston at Ottawa from such species as *Syringa villosa* and *S. reflexa*. These hybrids usefully extend the Lilac season, and are remarkable for the large size of their shapely panicles.

The value of many Rose species, even on the poorest soil, is illustrated by the extensive collection in Howard's Field. There are also many of the old-fashioned Roses which have been displaced from most gardens by modern varieties with a longer season.

In the herbaceous borders a long flowering season is just beginning, and the stretches of varying green are enlivened by several bold patches of colour. The large-flowered *Anchusa* 'Morning Glory' is most conspicuous, but more restful to the eye than certain scarlet Oriental Poppies or the pure magenta *Lychnis Flos-jovis*, happily separated by a respectable distance. The white starry flowers of *Gillenia trifoliata* are produced over a long period, and even when not in flower the plant has a peculiar elegance of habit and colour apt to be overlooked among its coarser neighbours. *Astrantia maxima* (*helleborifolia*) is another old plant of distinction with rose-coloured inflorescence-bracts which remain bright long after the flowers have faded.

As at most times of the year, the Award of Merit Garden, the Temperate house and the Half-hardy house will have a selection of good things to offer visitors who can spare time to inspect them.

THE WAR-TIME KITCHEN GARDEN.

JUNE.

Pests and Diseases.—A list of the troubles that may beset a crop is apt to alarm the inexperienced, but, though one or two pests are so common that preventive measures should be taken, there is no reason to suppose that the whole collection of possible calamities will overtake every planting. Good cultivation is the surest means of preventing attack; sturdy plants in good surroundings can resist many things; it is the sickly plant, crowded by its neighbours or choked with weeds, that falls an easy prey. And when trouble comes, immediate action should be taken; if greenfly is noticed on Monday, deal with it on Monday—by the following week-end each greenfly will have multiplied itself many times. In the same way fungoid diseases may spread very quickly under certain climatological conditions.

Suitable remedies should be at hand in case of need; Derris or Nicotine are useful for most insect pests on leaves and stems; the former is non-poisonous (except to fish) and so is safer to use on mature crops whose leaves are the edible portion. Both can be had in two forms, either as dust, applied by means of a blower, or in a solution which can be sprayed on with a syringe. For pests that attack plants at or near ground level (Carrot Fly, Turnip Fly, etc.) whizzed or flaked naphthalene is a useful deterrent; it can be sprinkled round the seedlings as soon as they appear and when they are being thinned. Crude naphthalene can be used for insects that live deeper in the soil when there is no crop on the ground, otherwise they should be trapped in slices of Potato or Carrot. Calomel is useful (in powder form) for

preventing attack by Cabbage Root or Onion Fly. Fungoid diseases may be treated with powders such as Flowers of Sulphur or with such solutions as Bordeaux or Burgundy mixtures.

Onion Fly is more prevalent in some districts than others, Carrot Fly, too, is common ; both attack plants in the seedling stage, so that a dressing of naphthalene is a useful deterrent. Potato disease is so virulent when it occurs that steps should be taken to guard against it by spraying with Burgundy or Bordeaux mixture towards the end of June. Tomatos grown out of doors do not usually give much trouble, but they too should be sprayed as a precaution in districts where Potato disease is prevalent ; the two plants are of the same family and have similar susceptibilities.

For the detailed treatment of pests reference should be made to *Some Seasonal Pests of Garden Vegetables and their Control* by G. FOX-WILSON (R.H.S. JOURNAL, **65**, p. 407), and for fungoid diseases consult *Hygiene in the War-time Vegetable Garden* by D. E. GREEN (R.H.S. JOURNAL, **66**, p. 28 *et seq.*).

Any treatment that is undertaken should be carried out thoroughly ; for instance, spraying over the top of a plant is of little use if the pest is on the underside of the leaves. With Brassicas, whose leaves have a waxy coating, it is essential to see that the leaves are wetted ; water alone will just roll off in drops, a "spreader" must be added to be sure that a continuous film all over the leaf is obtained. It is seldom sufficient to spray or dust once only ; the first operation will kill the adult insects, but eggs may be left which will hatch out later, so that treatment should generally be repeated in a week or ten days.

Above all keep the plants well tended ; thin well, hoe frequently, do not over-fertilize so as to produce weak growth, keep down weeds and remove all dead leaves as they occur, then the plants have a reasonable chance of resisting the various diseases that might attack them.

Work to be done.—Garden Swedes should be sown and successional sowings made of Runner and Dwarf Beans, also of Beet, Carrots and Kohl Rabi ; Lettuce can still be sown in not too dry a position. Brussels Sprouts, early Cabbages and Cauliflowers can be planted out this month ; Celery and Celeriac should be planted, the former in prepared trenches, the latter on level ground. Ridge Cucumbers and Marrows can be put out of doors now, also Tomatos, which should be staked at once. All seedlings should be thinned as they require it. Continue to hoe.

Frames.—All seedlings will have been removed from the frames by the middle of this month and Ridge Cucumbers can be spaced out and trained by pinching off the shoots to make them branch. If any frame is vacant, Lettuces and Radishes may be sown there where conditions of shade and moisture are under better control than in the open ground.

Greenhouse.—Tomatos and Cucumbers should have constant attention ; fertilizers should be given at fortnightly intervals.

Crops available from the garden in June.—Broad Beans, Cabbages,

Carrots, Cauliflowers, Lettuces, Peas, Radishes, Spinach, Spring Onions, Tomatos if grown under glass.

The Fruit Garden.—Wall-trained Plums and Gages are now growing rapidly and the new growths should be regulated in order to reduce winter pruning to a minimum. Tie in the new shoots where wall space permits and where further extension growth is required. Young shoots are tied to any old and worn-out branches which they replace when winter pruning is done. Surplus shoots are then pinched back to three or four leaves or completely removed if overcrowded. Never tie in the growths too tightly, but leave room for the expansion of the shoot.

At the end of the month cordon Gooseberries and Red Currants will be about ready for summer pruning. Shorten the side shoots back to three or four leaves, but do not prune the leading shoot. Should the Gooseberry bushes be carrying a heavy crop, thin by removing the berries from low down on the bush, together with those which are awkwardly placed.

Regulate the growths on Morello Cherries by pinching out badly placed growths and also those which are causing congested conditions, always keeping the best placed growths to replace the old fruiting wood when this is cut out in the autumn.

While it is as yet too early to do the proper thinning of Apples, it is a wise precaution to go over trees which have set heavily and relieve the branches of excessive weight by removing surplus fruit. Remove malformed, undersized, and a few of the more badly placed fruit, simply to relieve some of the strain on the tree, but do not attempt to do any final thinning at this stage. The final thinning is not carried out until after the "June drop," a function which more often than not extends well into July. While carrying out this preliminary thinning keep a sharp look-out for any fruit which have been attacked by Apple Sawfly; these fruit should be picked off and burned immediately. The same advice applies to Pears which are carrying heavy crops.

On Black Currants keep a look-out for Aphis and, if the pest is observed, spray with one of the non-poisonous insecticides. Bushes attacked by Big Bud Mite, or Reversion, should be marked and immediately the crop has been gathered dug up and burned. Never leave such bushes as they are a source of infection for healthy stock.

There was a good deal of late planting this year owing to the severe winter, and late planted trees and bushes must be carefully watched in order that they do not become dry at the root. In the event of dry weather, give such trees a thorough watering followed by a mulch of farmyard manure or spent hops.

In the early Peach house support the swelling fruit by fixing a wooden label between two wires and let the fruit rest on the label. Tie back or remove any leaves which are shading the fruit. Stop feeding as soon as the fruit start to colour, and a good watering at this stage should be sufficient to carry the tree through until the fruit is ripe.

THE DEVELOPMENT OF THE AURICULA.

By Professor Sir ROWLAND BIFFEN, F.R.S.

ALTHOUGH, as might be expected from the length of time the plant has been in cultivation, the literature dealing with the Auricula is extensive, it provides little information about its origin and its main lines of development. One of the first records is due to CLUSIUS who, in 1598, saw plants growing in a garden in Vienna and learnt that they were natives of the Alps. Tradition has it though that they were introduced into this country even earlier than this by Flemish weavers driven from their homes by the persecutions of ALVA, and by GERARD, which makes it certain that they were grown here in 1597. The only form however which CLUSIUS describes in the *Herball* seems to be *Primula Auricula* itself and he makes no mention of its vari-coloured hybrid descendants. From then onwards records, often in considerable detail, are to be found which prove the existence of a number of strikingly distinct forms, but it was not until the latter half of the nineteenth century that KERNER showed that the starting point of the garden Auricula was to be found in the natural crosses which occur here and there in the Alps where *Primula Auricula* and *P. hirsuta* happen to be growing together. When the general validity of MENDEL's principles of heredity had been established, it became possible to check the accuracy of this view by noting the main characters of the reputed parent plants and determining how they were distributed amongst the Auriculas now in cultivation. A rough analysis on these lines at once brings out the fact that the simple recombination of these unit characters is sufficient to explain the origin of many Auriculas. But, at the same time, it becomes clear that it is a partial explanation only, for the majority of Auriculas cannot be fitted into this scheme owing to the fact that they show features which find no counterpart in the wild-growing parents. The most noteworthy of these are the coloured edges of the flowers and the paste—that is, the two features which more than any others make the Auricula one of the most distinctive of all flowers.

One of the objects of the investigation, now to be briefly described, was to find out more about these particular characters and to trace, if possible, their connection with the parent plants. During its course a preliminary study of the inheritance of the more important characters occurring in the chief groups was undertaken, partly in order to obtain further information about the curious technique handed on from generation to generation of Auricula raisers and partly in the hope of recovering characters which, though once considered of horticultural importance, are no longer to be seen in the present-day plants.

It is necessary to have some knowledge of the chief characteristics of the parents before attempting to make a detailed study of the groups into which the Auriculas have been classified. Only those

features which are directly concerned with the problems in hand need be considered here. They are, briefly, as follows. The flowers of *Primula hirsuta* are usually of a rosy purple colour with a small white centre, but the tone may vary from a dark beet-root colour down to white; a bluish lavender form is also known. The colour is gradated, being deepest towards the centre of the flower and palest towards the margins. The leaves are a vivid green and their edges are slightly hairy. In *Primula Auricula* the flower colour is a uniform imperial yellow and the central portion of the corolla is lightly powdered with white meal. The foliage too is usually more or less coated with meal. The species is an aggregate of subspecies and forms, some of which will require description later.

The rosy purple colour, hirsutin, belongs to the group of plant pigments known as anthocyanins. It resembles litmus in turning crimson when in contact with a dilute acid and violet in the presence of an alkali. Thus, this single substance may be responsible for three distinct colours according to whether the cell sap is acid, neutral, or alkaline.

It is produced only in distinctive transparent, pear-shaped cells which take the place of normal epidermal cells. This layer can be peeled off leaving the white ground of the petal exposed. If a piece of it is examined under the microscope it is found that the colouring matter is in solution in the cell sap and that it readily diffuses from any cells injured during the making of the preparation.

The yellow colour of *P. Auricula* on the other hand is distributed throughout the tissues of the petals in an insoluble form.

The group known as "Alpines" comes closer to the parent species than any of the others. Its essential characters are that the colour is uniformly gradated, and that the centres of the flowers, which may be either yellow or white, are free from any trace of meal. The foliage is mealless. The colour range of this group is a wide one, for the crimson, purple and violet-blue may range from their deepest shades down to pale rose, lavender and blue, and further they may overlie a yellow as well as a white ground and so give rise to orange, brown and maroon colours. The range is widened still more by the existence of a second yellow colour, of a yellowish buff shade quite unlike the rich yellow of *P. Auricula*. It is not known to occur in this species and may have been introduced from another group of Auriculas.

Their vivid colouring, neat habit of growth and outstanding hardiness have made the alpines popular border plants. Judging from the colour range found in plants grown from commercial seed the popular taste is mainly for the brightly coloured forms, and this tends to hide the fact that a long series of pale pinks, blues, lavenders, dove greys, green-greys, beige-pinks, browns and so on exist. It is amongst these subtly coloured forms that the presence of the buff-yellow underlay is most obvious.

Most batches of seedlings raised from commercial alpine seed contain a number of plants with more or less mealy foliage and a slight

powdering of meal in the centre of the flowers. They are sometimes described as "border" Auriculas. The group appears to be a well defined and extensive one, but little attention has been paid to it in the course of these investigations. Judging solely from somewhat casual observations, it appears to represent the *P. Auricula* end of the series of *P. Auricula* and *P. hirsuta* derivatives, for the colour range seems to be identical in both sections.

The "selfs" are, from the florists' point of view, a simple and easily recognizable group characterized by the facts that the colour is of a uniform tone throughout the corolla and that the throat of the flower is surrounded by a clean cut ring of intensely white "paste." This is built up of myriads of the wax-secreting hairs similar to those which give rise to the meal of the foliage leaves and form the powdery zone in the centre of the flowers of *P. Auricula*. The microscopic rods of wax are too fragile to withstand the action of the weather, and consequently the plants need protection during their flowering period. The colour range is even wider than that of the alpinas; in fact it may be questioned whether any other flower in cultivation can show so diverse a series of colours. The foliage may be either mealy or meal free.

In the next group, the "edged" Auriculas, the formality of the flowers reaches an extreme limit and this, together with their unusual colour schemes, made them popular as florists' flowers some two centuries ago. Even to-day they are the most appreciated of all of the Auriculas.

The group is divided into three sections—namely those with green-, grey- or white-edged flowers. Between the edge and the paste is a band of colour, the "body" colour. The general preference is for flowers in which the body colour is of an intense black, but the colour range is in reality a wide one. To appreciate its extent it is necessary to cross-breed any available edged forms of unusual colouring, since from commercial seed little except the darkest shades can be obtained.

Closely connected with the edged group are the "fancies." This group has not been clearly defined and the term is used here, in perhaps a more limited sense than usual, to describe a group of edged flowers in which the body colouring is missing. In its place is a yellow ground and the general colour scheme is consequently green and yellow. The lack of the factor or factors responsible for the production of colour makes the breeding of good fancies a comparatively simple matter. In fact it has so simplified the genetic constitution of the group that plants capable of breeding true to seed, when self-pollinated, are not uncommon. In spite of this the fancies never seem to have attained the popularity of the other groups. The reason is not far to seek, for if a batch of the plants is set alongside one consisting of green-, grey- and white-edged plants, it has to be admitted that, whilst they have a beauty of their own—perhaps an anaemic prettiness would be a better description—they completely lack the Mona Lisa-like charm of the latter.

The green, grey and white coloured edges of the corolla provide the outstanding difference between the edged and fancy Auriculas and their wild-growing parents. Their nature has for long been a matter of speculation rather than of observation. But an examination of sections of the corolla of any green-edged Auricula shows, without any possibility of doubt, that its structure is identical with that of a true foliage leaf. Apart from the presence of the usual palisade layer and the spongy parenchyma, the most noteworthy feature is the marginal band of stalked glandular hairs identical with those of the foliage leaves. These last can, as a matter of fact, be detected under a hand lens on most green-edged flowers, especially when examined in an unopened condition. The same is true of both the grey- and white-edged flowers, which in reality are green-edged flowers in which the green ground is either partially or completely masked by a coating of meal. A simple method of demonstrating this is to pass a brush charged with methylated spirits over the flowers, when the wax, which constitutes the bulk of the meal, goes into solution and leaves the green ground visible. The distinction between grey- and white-edged flowers is a somewhat arbitrary one though useful enough for show purposes. Broadly speaking, the grey-edged flower has a silvery white margin surrounding a greenish grey zone which abuts on the body colour, whilst in the white-edged flower the white of the margin extends to the body colour. In such flowers the meal on the reverse is often sufficiently dense to render it a uniform white colour, whereas in those with a grey edge the flower colour is generally very obvious.

Once the fact is recognized that these edges are leaf structures, which it will be convenient henceforward to describe as "petal leaves," it becomes clear that the flowers provide an example of the phenomenon known variously as virescence, frondescence or phyllody. This is somewhat rare amongst garden plants though more common in wild plants than is generally suspected. One of the best known examples happens to be provided by a nearly related plant, the green Primrose, in which the leafiness of the petal-leaves is unmistakable, owing to their possessing the characteristic corrugations of the foliage leaves.

No evidence has been found in the various Alpine floras to show whether virescent forms of either *Primula Auricula* or *P. hirsuta* exist in the wild state. But this applies also to our own wild Primrose, virescent forms of which are met with with fair frequency. It is thus no proof of their non-existence but simply an expression of the fact that the systematists of the past have ignored the abnormalities which gardeners speak of as "sports" and students of heredity as "mutations."

Whether they occur or not it is safe to assume that no wild-growing mutation was introduced into this country and made use of in the development of the Auricula, for it is known that the green-, grey- and white-edged sections were in cultivation by 1750 or approximately a century before the parentage of the plant was recognized. The

number of forms then available and the well-known slowness with which they can be vegetatively propagated makes it almost certain that the original mutation occurred here many years before this. Precisely what it was like is naturally enough unknown. But probable counterparts of it crop up from time to time nowadays. A typical example is shown in Fig. 62, in which the leafiness of the deep green petal-leaves is obvious as well as an ill-defined but otherwise perfect paste. A mere speck or two of body colour is present on the face of the flower, but on the reverse the bases of the petal-leaves are heavily marked with a purple-black colour which extends up the midrib and for a short distance along the margins of the petal-leaves. A second, very similar, example has been found and a third with pale green petal-leaves and no trace of body colour. All three plants have smaller foliage leaves than the ordinary run of Auriculas, and they are further characterized by the slowness with which the flowers open and by the fact that they may persist unfaded for as much as three months.

This modified green corolla has an obvious resemblance to the calyx which becomes still more striking when the sepals themselves, as frequently happens, become leafy. Good examples of this phenomenon are seen in Figs. 63 and 64, in which the calyces instead of showing the usual small, cup-like structure are flattened out and are from an inch to an inch and a half in diameter. Moreover each of them carries a typical paste indistinguishable from that of the flowers which have been assumed to be counterparts of the original mutation and from that of any of the edged Auriculas. Apart from these somewhat aberrant forms the distribution and characteristics of the paste can be seen clearly in any collection of Auriculas if the plants are examined when the corollas have fallen. It forms a layer, often of great density, in members of the edged, fancy and self groups and also in the type *P. Auricula*. In the alpine section it may or may not be present, the calyces having the character of either *P. Auricula* or *P. hirsuta*. The inner margin is sharply delimited whilst the outer is generally, though by no means invariably, somewhat diffuse.

As it is exceedingly improbable that the calyx has ever been subject to any attention from Auricula breeders and is consequently still in its natural condition, it seems safe to conclude that the paste is normally developed on a leaf structure. The whole corolla of the original mutation was thus involved and it is not the case, as might seem possible at first sight, that only the portions which are usually coloured were affected and an existing paste left unaltered. Further the older view that the paste is an extreme development of the meal found in the throat of the flowers of *P. Auricula* must be abandoned. Incidentally too its presence may be taken as an index of a leafy origin when examining structures in which this is not self-evident.

When the view is accepted that the petal-leaves are miniature foliage leaves, a more detailed comparison of the flowers and the foliage becomes necessary. The diversity of the latter is bewildering owing to the re-combination of characters resulting from the endless crossing

Auriculas have been subject to. It is simpler therefore to make the comparison with the wild parents, and this also has the advantage that it provides better standards than the less generally known show varieties. Differences of shape, margin, etc., are of relatively little concern for the moment and attention need only be given to those associated with the presence or absence of meal and the extent of its development where it occurs.

The foliage of *P. hirsuta* varies little : it is entirely devoid of meal ; the leaf edges bear small glandular hairs and the colour is a distinctive vivid green. These are the features characteristic of the bright green forms of the green section of the edged Auriculas.

The foliage characters of *P. Auricula* are more complicated. The species is an aggregate consisting of a number of subspecies and forms, some of which are sharply confined to widely separated districts. The type *P. Auricula* is mealy, but the subspecies *P. A. ciliata* is absolutely meal-free even at the base of the calyx. Its deep green leathery foliage can often be distinguished in Auriculas and it may be that it is represented in the more deeply coloured members of the green-edged section. Against this view must be set the fact that no completely pasteless green-edged auricula is known to exist.

In the type *P. Auricula* the foliage may carry anything from the lightest of powderings to a layer of meal which is so dense that it flakes off in patches. In this respect it matches the grey- and white-edged forms, for these do not form two precise groups as the florists' classification indicates, but a continuous series beginning with forms bearing so little meal that at first sight they appear to be green-edged and ending with forms which are so mealy that they are best described as "encrusted."

Another meal-bearing subspecies is *P. A. Bauhini* (including *P. A. albocincta* and the *P. A. marginata* of plant catalogues). In this the degree of mealiness is rather variable, but the main characteristic is that the meal forms a particularly dense coating on the margins of the leaves, so giving them a clean cut silvery edge. This is to be seen in the foliage of many Auriculas and in the petal-leaves it has provided the starting point of the only grey-edged forms recognized on the show bench, namely those in which a distinct margin of silvery white bounds a zone of greenish grey. A similar series of meal-free and mealy flowers occurs in the fancies.

Thus it seems clear that the superimposing of these foliage characters on the petal-leaves of the original mutation has been responsible for the development of the green, grey and white sections of the edged group and of the corresponding fancies. Further, it should be observed that the types of mealiness associated with the foliage leaves of the parental forms are all readily recognizable in the sepals and, when these happen to form an enlarged and leafy calyx, it might at first sight be mistaken for the corolla of an edged flower (Fig. 65).

An interesting phenomenon connected with the meal on edged flowers is that green- and grey-edged flowers occasionally occur on

the same plant. When this happens the green flower always springs from the base of the plant, whilst the terminal flower is grey-edged. The peculiarly slow development of the meal appears to be responsible for the occurrence of the two kinds of flower. A seedling of a grey- or a white-edged plant starts its life with meal-free foliage and continues to produce bright green leaves for months. As a consequence when investigating the genetics of mealiness the plants cannot be classified until they are at least a year old, and even this limit is not necessarily a safe one. Once mealy leaves begin to develop all of the subsequent growth on the main axis which is capable of showing this feature does so. But any lateral growth from the older part of the stem still fails to develop meal. Thus the small side shoots used in the vegetative propagation of the Auricula are invariably meal-free and usually remain so for months. Similarly, should a flower truss develop, it, too, is incapable of developing meal, and its flowers are consequently green-edged. It is a transitory phenomenon, for such flowers can sometimes be found on side shoots which, if detached and grown on as cuttings, give rise to normal grey-edged plants. The subject is worth further investigation from the plant physiologist's point of view.

Owing to the presence of chlorophyll in the petal-leaves the colour problems of the edged flowers are of especial interest. They have been investigated for the most part in plants belonging to the grey-edged section, because the general experience of Auricula breeders pointed to interesting possibilities. Amongst these was the fact that crosses between them frequently gave rise to a different class of Auricula—namely, the selfs.

The body colours generally seen on the show bench are either an intense velvety black or some shade of vandyke brown, crimson or purple so deeply toned that it approximates to black. But those who have come under the spell of the perfectly formal flower seem to have limited themselves, in the main, to a colour symphony of silver, greenish grey, black and white, which, though beautiful in itself, is far from being representative of the group as a whole. There is also a wide range of other colours. One of the best known is a deep clear violet-blue which harmonizes exquisitely with the grey-green and silver of the edge, whilst others are chestnut, brick red, cinnamon brown, rose, vinous mauve, pale pink and lavender. Probably had more plants been available, still other colours would have come under observation. The colouring matter is again an anthocyanin in solution in modified epidermal cells similar to those occurring in the alpine group, and, though the concentration may be considerable, the depth of the colour in the usual forms is largely the result of its overlying the more or less complementary green of the chlorophyll in the petal-leaves.

But the existence of the lighter colours points to the fact that in the regions underlying the body colour the chlorophyll is missing, for the pigment layer is translucent, and a thin skin of violet-blue or

rosy pink could not tell as such if overlying a rich green background. From what has been seen in the alpine section it seems probable that many of these colours are superposed on a white, or at the most a lightly tinted ground. The colour of the interior of the tube sometimes suggests that this is the case, for in the violet-blue flowers it is white instead of the usual golden yellow of most show Auriculas. This view is confirmed not only by a microscopic examination of the petal-leaves but by a comparison of the colouring of the green- or grey-edged sections with the fancies in which the body colour is wanting.

The fancies may, for convenience of description, be divided up into three groups. In the first the whole of the petal-leaf excepting the paste is green. In the second the chlorophyll in the immediate neighbourhood of the paste and for a short distance up the petal-leaf margins is replaced by a yellow pigment, leaving only the apical portions the normal green colour. This is the type most usually met with—the “green-edged, yellow ground fancy” of the florist. The yellow colour may be a pale, greenish sulphur shade which bleaches to a dingy white as the flower ages, a pale or a medium cadmium or an ochraceous gold. It is due to the formation of xanthophylls similar to those occurring in the variegated foliage of such plants as Aucubas or Golden Privet. In the third section the chlorophyll disappears entirely and concurrently the petal-leaf loses some of its massiveness. The flower thus becomes a yellow or a dingy white self, and the only trace of its direct origin from a fancy is to be found in the occasional persistence of the silver edging either as a delicate wire edge or as white flecks of meal on the margins of the petals.

The factor responsible for the disappearance of the chlorophyll and its replacement by a xanthophyll is, like that for the production of meal, late in developing its effects. Thus the basal flower of a plant may be a typical green-edged yellow ground fancy and the terminal flower a true yellow self.

The areas in which the chlorophyll has disappeared in the second section obviously correspond with those occupied by the body colour of the edged flowers. This area is a very variable one, and even in a group of plants raised from seed obtained by self-pollinating the best of the show types it may be merely a narrow zone surrounding the paste or it may extend to the margins of the petal-leaves. The ideal width, so often a matter for serious discussion amongst florists, is none too frequently met with and heavily zoned, sombre-looking flowers preponderate. These constitute a transition stage to the selfs, for there is no sharp cleavage line between, say, a black self and the too heavily marked green- or grey-edged flower. But again, as in the yellow selfs arising from fancies, slender silvery wire edges or marginal flecks of meal often serve to indicate their origin from a grey-edged flower. The black selfs are usually accompanied by selfs of other colours, more especially purples of various tones, brownish reds, vinous mauves and rarely violet. The colour differences then

indicate the heterozygous nature of the colour of the parent plant. These selfs are the coloured counterpart of the third section into which the fancies were divided.

As is, perhaps, to be expected from the close connection between the edged and the self groups, chlorophyll may well be present in the latter. That this is the case is often demonstrated as the flowers fade. The corollas of the vinous mauve and purple flowers just mentioned, for instance, may turn to a deep green before they are ready to fall, and even a vivid scarlet flower may show an undertone of green as it ages. Again, flowers of a brick-red colour generally darken as they age and show patches of green before they die off. There is a probability that in such cases the plants are heterozygotes, for the presence of chlorophyll acts as an imperfect recessive which makes no impression on the flower except in its latest stages of development.

Such a mode of origin for the selfs implies that their colour range should be generally similar to that of the edged group. In the material accumulated in the course of the investigation it is a far wider one, but the gap narrows each season as further crosses produce new colours in the edged group and, for the time being, it can only be concluded that a sufficiently representative collection to test this view has not yet been obtained.

Again, the colour range is greater than that to be found in the alpine section, and though many colours are common to both groups some of those to be met with in the selfs and the edged flowers are often strikingly distinct. New colours, such as the vivid scarlet of the self 'Adonis' or the rich violet-blue of the edged 'Colonel Champneys,' provide typical examples. They suggest the presence of other members of the anthocyanin group, such as pelargonin and delphinin. But until they have been isolated this must remain a matter for speculation only. New colours, however, are to be expected, for the introduction of chlorophyll and its derivatives must have brought in its train profound differences in the metabolism of the petal-leaves. If the petals and petal-leaves are looked upon as factories for the manufacture of pigments, then in the relatively simple alpine group the raw materials available may be sufficient for the making of hirsutin only, but the groups with petal-leaves can draw on a far wider range, for they have available in addition all of the products of the chlorophyll's photosynthetic activity.

The mutations already described—namely, the virescent flower and the factor which brings about the replacement of its chlorophyll by yellow xanthophylls—are by no means the only ones known to have occurred in the long history of the cultivation of the Auricula. Some have been preserved by critical florists and ultimately embodied in distinct new races of this widely variable plant whilst others, which offered no promise of adding beauty to its flowers, have been passed over. It may well be that the stock of useful mutations has by now been exhausted, and that no further improvements along such lines

are to be looked for. But so little is known about mutations in general, and their occurrence is so rare and apparently so spasmodic that any fresh information about them is worth recording.

One of the first to appear was the doubled flower which, in the days before the sheer formality of the single show flower was appreciated, had a great vogue. The contemporary descriptions of these double flowers suggest that they were far from being unattractive, but of the few which are still in cultivation the kindest thing to be said for them is that they are curious rather than beautiful. It would probably be a simple matter to raise a new race of them, for not only do the few existing doubles occasionally produce a small quantity of pollen, but the beginnings of doubling are found with considerable frequency in all groups of the Auricula. This takes the form of one or more of the stamens of the flower assuming the shape and colour of the petals. Some of the seedlings raised from self-pollinated flowers of such incipient doubles repeat this characteristic on a more marked scale, but so far nothing comparable with the descriptions and illustrations of the older types has been met with.

Another mutation gave rise to the once popular race of striped flowers. In these the flowers were either single or double, and the petals were marked with radiating stripes of yellow or white. GILBERT, writing in the middle of the seventeenth century, speaks of them as "ennobled Auriculas," and provides some indication of the esteem in which they were held by quoting the prices, ranging from four to twenty pounds, of some of the best forms. That a feature which obviously makes for formality in the flower should have disappeared so completely is perhaps surprising. The only example of it met with so far is a plant purchased under the name of 'Old Dusty Miller.' The 'Dusty Millers' are cottage garden survivals which are now finding a place in rock gardens. They are a somewhat primitive type which comes close to *Primula Auricula*, except in the colour of its flowers, which is generally a dull red. In the 'Old' form there is a double system of striping, namely, yellow on a red ground and white. The former is produced by the failure of a superficial crimson pigment layer to cover the whole of the underlying yellow ground, the latter by radiating lines of meal running from the powdered centre to the periphery of the corolla. Unfortunately, the old descriptions of striped flowers are not sufficiently comprehensive for any decision to be arrived at as to whether their white stripes were produced in this unexpected manner.

The formation of an additional corolla whorl making the Auricula flower comparable with the hose-in-hose Primrose is probably common. But the second corolla is usually inconspicuous. It extends to about half-way up the tube of the normal flower and ends in five or six diminutive petals which soon roll back on themselves. A few better developed specimens have been found with petals three-eighths of an inch across, resembling those of the normal corolla in their white edging and black body colour.



Photo N K Gould

FIG. 60.—IRISES AT WISLEY



Photo N. K. Gould

FIG. 61. *ANACYTUS MAROCCANUS* AT WISLEY, 1941
see p. 183.



FIG. 62 — LEAFY CALYCES OF AN ALPINE *AURICULA* WITH A WELL-DEVELOPED PITCH-BENT PASTIL



FIG. 63. CALYCES OF A GRAY-EDGED *AURICULA*. THE SEPAL'S ARE LEAF-LIKE AND THEIR MARGINS HAVE A DISTINCT SILVERY EDGE. THE HEAVY PASTIL IS WIDELY DIFFUSED

(See p. 191.)



FIG. 64 - LEAFY CALYCES OF ANOTHER GRAY-EDGED *AURICULA* SHOWING A SHARPLY DEFINED SILVERY EDGE AND A PITCH-BENT PASTIL



FIG. 65 — A VIRESCENT AURICULA WITH TRACES OF BODY COLOUR AND AN
ILL-DEFINED PASTEL
(See p. 192.)



FIG. 66 — SCHIZOCODON SOLDANELLOIDES VAR. ALPINA.
A compact variety with darker flowers and redder leaves than the type.



FIG. 67—*CAMELLIA* × 'J. C. WILLIAMS'
(See p. 210)



FIG. 68. — FLOURISHING COLONY OF ROSE APHIDS
Macrosiphum rosae Linn.
(See p. 200.)



FIG. 69. — DYING, WINGLESS, VIVIPAROUS FEMALE ROSE APHIDS
PRODUCING YOUNG
36 hours after application of a slow-acting Contact Wash
(a). Young produced prior to spraying
(b). (See p. 200.)



FIG 76 — ROSE APHIDS, KILLED BY GUR-KING CONTACT WASH
(NICOTINE SOAP)
(Note — shriveled bodies of dead Aphides)
(See p. 201)

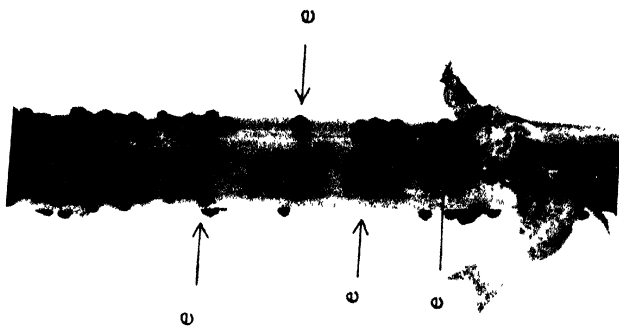


FIG 71 — IPHIS TALPACOTI, PARASITIZED BY
BRACONID WASPS, *Aphidius*.
(Note — stiffened chitinized segments of Aphides and
"e" emergence hole of parasite.)
(See p. 201)



FIG. 72 DELPHINIUM 'BLUE BUTTERFLY'
(See p. 206.)

Calyces with leaf-like sepals are to be found with great frequency, though their occurrence is apt to be overlooked unless the flower trusses are reserved for seed. After the fall of the corolla they generally flatten out to form a green "flower," sometimes as much as an inch and a half in diameter. Examples with a well-developed paste and an edging of silver have an attractiveness of their own.

The only other calyx mutation which has been met with up to the present is one in which the sepals are coloured. This occurs consistently in one clone, but the change is only a partial one affecting at the most three of the five sepals. The flower is a crimson self and the petaloid sepals are black with a silver margin.

The production of viviparous flowers is one of the rarer mutations in the plant world. A solitary example was found in the course of these investigations. In this the ovaries, instead of producing seed, gave rise directly to small plants, a few of which were pricked out and grown on to the flowering stage. All accurately reproduced the characteristics of the parent plant (which happens to be unusual in some respects) except one, which instead of throwing a white-edged, black body coloured flower threw a white-edged yellow ground fancy. Until the mode of development of these viviparous plants has been worked out in detail nothing more can be said, except that they appear to have provided an example of the dropping-out of a colour-producing factor.

The facts now available are sufficient to provide a fairly comprehensive view of the origin of the Auriculas. KERNER'S investigations paved the way by establishing the fact that the alpine section was derived from natural crosses between *Primula Auricula* and *P. hirsuta*, though they failed to give any indication of the origin of the highly distinctive show groups—that is, the edged, the fancies and the self Auriculas. The starting point of these was a mutation which occurred in a plant of the alpine section and resulted in the production of a corolla in which two of the characters of the sepals—namely, the presence of chlorophyll and of a well-developed paste—were present. The evidence at present indicates that these two features are associated as a single unit character. Like the majority of mutations it is recessive to the normal and consequently, if the original mutated flowers were self-pollinated, an edged, paste-bearing strain was immediately established. In the petal-leaves of these green corollas various characters associated with the foliage of the parents then put in an appearance. The most noteworthy of these are the silvery margin, typical of the foliage of some forms of *Primula Auricula Bauhini*, and the dense coating of meal to be found in the type *P. Auricula* and elsewhere. These provided the differentiating characters of the grey- and white-edged groups. In addition various degrees of mealiness can be recognized, and though too vague for classifying satisfactorily, they can be tentatively assigned to other forms of the wild species. Such evidence as can be derived from a historical study of the group points to the fact that a further set of mutations was

responsible for the appearance of these new features. They again are recessive to the "normal" green, meal-free corolla.

The next developments are best seen in the fancy group, which is a counterpart of the edged group except for the fact that the ground colour is not hidden under a layer of body colour. Whether this originated directly as an entirely green, petal-leaved mutation, or whether the factor responsible for colour dropped out from a plant of the edged group cannot be determined. The main point of interest in the group is that it shows that profound changes next occurred in the chlorophyll itself. These led to its replacement by xanthophylls ranging in colour from golden yellow to dingy white in colour. The change took place in two stages as the fancies are either wholly green, green and yellow or yellow to white in colour, the last being, except for possible reminiscences of a silver edge, true selfs. A similar change occurs in the edged group, the body colour of which occupies the zone of decolourized chlorophyll of the second group. The localized lack of the green colour makes possible the appearance of the paler colours in this group, and its complete lack the development of the self group. Whether the components of the corolla of the selfs should now be described as petals or petal-leaves may be a matter for argument, for as far as the coloured portion is concerned they appear to be true petals, but the paste, still persisting in its original intensity, is that of a petal-leaf.

The fact that a number of other mutations has been detected shows clearly that Auriculas are singularly subject to these spontaneous "breaks." In this respect the cultivated plant markedly resembles one of its parents, *Primula Auricula*, which in the wild state has given rise to a notable series of subspecies and forms, many of whose distinguishing features can be recognized in it, sometimes with certainty, sometimes only vaguely. The more stable *Primula hirsuta* on the other hand seems to have been responsible chiefly for the anthocyanin colours of the flowers and the bright green foliage of the alpine and green-edged Auriculas.

This faculty of mutating in various directions must have been carried by the first of the natural hybrids imported here. It provided, step by step, a number of new and extraordinarily distinctive features which in the hands of the old-world florists became the basis of the flowers as we now know them. They, however, simply found and, what is of greater importance, preserved these ready-made "breaks," their preservation being simplified to a great extent by the fact that most, if not all of them, were inherited as recessive characters. On these the wide range of colours found in each of the various groups was built up, if historical evidence is to be trusted, almost entirely by chance hybridization. Whether with the wider knowledge of heredity now available still better results can be secured remains to be seen, but it is reasonable to hope that the problems which confront those who would raise perfect flowers can be appreciably simplified.

APHIDES, WITH SPECIAL REFERENCE TO THEIR CONTROL.

By G. Fox-WILSON, F.R.E.S., F.L.S., N.D.H., Entomologist,
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APHIDES, which are commonly termed Green and Black Flies or Plant Lice, are of the greatest economic importance as plant pests owing to their numbers, both individually and specifically ; to their high rate of breeding ; to their mobility during the winged migratory phase from winter (primary) to summer (secondary) hosts ; to the fact that they are exclusively plant feeders ; to their wide range of hosts, including cultivated and wild plants both out-of-doors and under glass ; to their direct effect on plants by the laceration of the tissues and the abstraction of sap which results in reduced vigour ; to the potentiality of many species to serve as vectors (" carriers ") of Virus diseases ; and to their indirect effect on plants resulting from the deposition of honeydew (Fox-WILSON¹).

The taking of active measures for reducing infestations on plants of all kinds, especially food crops, is essential, and the object of this note is to outline some reasons for the poor success too often reported against Aphides by spraying and dusting operations. While it is not claimed that an attack of Aphides is completely eradicated by spraying, the thorough application of a reliable contact wash will reduce an infestation to a minimum, and to achieve this end it is necessary to use a suitable insecticide for the purpose, to apply it correctly and at the right time, and to use a reliable spraying machine.

Life Cycle of Aphides.—Aphides reproduce both sexually and asexually (without males), the former oviparously (by eggs), and the latter viviparously (living young) ; there are both winged (*alatae*) and wingless (*apterae*) forms ; they are seldom restricted to one host, while many species have a wide and varied range of food plants ; they differ considerably in the number of successive generations a year, and in their habits of alternating between one part (roots) of the plant and another (leaves and shoots) on the same host (Woolly Aphis) or on completely different hosts (Dogwood Aphis) ; and they produce conditions in the plant which may react in several ways, including leaf-curl, gall formation and so on.

Many of our Aphides overwinter in the egg stage on plants, especially woody plants (e.g. fruit, forest and ornamental trees and shrubs). These eggs hatch in spring into nymphs which, when mature, are termed " Stem Mothers "—wingless (apterous) female insects which reproduce asexually (i.e. without males) and viviparously (i.e. produce living young). The insects increase enormously during the spring and early summer owing to the fact that the young produced by the " Stem Mothers " are capable of producing further broods of living young

in a short time. Each wingless viviparous female may, under favourable conditions, produce six or more living young per-day and continue to reproduce at this rate for one, two or more weeks according to the species and to climatic conditions. Sooner or later there appears a winged generation which flies off (migrates) to the secondary host plants—for instance, the Bean Aphis, *Aphis fabae*, alternates between the Spindle tree, Euonymus, and Broad Beans and many other plants. On these summer hosts, the winged females produce wingless, viviparous females which continue to produce similar forms until late summer or autumn, at which time winged forms again appear, when there is a return flight to the winter hosts, upon which are produced a wingless brood of egg-laying (oviparous) females which, after being fertilized by winged males that appear at the same time, deposit the winter eggs.

The period of greatest reproduction out-of-doors is in spring, when the viviparous females are producing living young which reproduce further broods, so that the Aphis colony increases enormously in the course of a week or two (Fig. 68).

The effect of a slow-acting contact wash when applied to these colonies of wingless, viviparous females is that the insects die slowly and, during the comatose state through which they pass prior to ultimate death, are often capable of restricted viviparous reproduction. The young so produced may survive and in the course of a few days continue to reproduce, thereby setting up a fresh infestation soon after the completion of the spraying. It will be seen later, however, that certain insecticides leave a residue on the foliage which has a repellent action on Aphides so produced and which ensures against immediate re-infestation.

BIOLOGICAL FACTORS AFFECTING THE RE-INFESTATION OF SPRAYED PLANTS.

It is not infrequently observed that Aphides reappear on sprayed plants even where the operation has been carried out in a satisfactory manner. Some of the reasons for this occurrence are as follows :

- (1) By successive waves of migratory winged Aphides which have flown to the plants either from the winter host during early spring or from neighbouring plants and weeds which have not been sprayed.
- (2) By ants which carry the Aphides from plant to plant—this transportation may often be witnessed in gardens, especially in Rose beds where there is a high ant population.
- (3) By viviparous, wingless female Aphides which have been produced during the extended period of lethargy through which their parents have passed before dying and which may occur following the application of a slow-acting contact wash (Fig. 69). Stress is laid upon this method of re-infestation, for it is a factor that is generally overlooked, but one that

we have frequently observed to occur on plants sprayed with certain washes, the lethal effect of which is slow. The young Aphides so produced have been found capable of reproducing viviparously within a few days, thereby setting up fresh colonies.

Both biological factors and the effect of certain cultural operations affect the degree of attack by Aphides. So far as the biological effect of natural enemies is concerned, Aphides are the prey of many animals, including insectivorous birds, insect predators and parasites, and mention will be made only of the last group. The presence of parasitized Aphides on plants often misleads the grower into thinking that the insects have been killed as a result of his spraying. The bodies of Aphides killed by contact washes and dusts become shrivelled (Fig. 70), while those that are parasitized are recognized by their bloated appearance, stiffened chitinized segments and light brown or dull black colour and, after the emergence of the minute Braconid "wasp" (*Aphidius*), by a circular hole cut in the abdomen of the host to permit the emergence of the parasite (Fig. 71).

Again, it has been observed that some species of Aphides are capable of restricted viviparous reproduction when parasitized by *Aphidius* if they have passed the third ecdysis or moult (IMMS²).

Action on Insects by Contact Insecticides.—Contact washes are grouped into those without and those with ovicidal properties. The former group comprise the vegetable alkaloids (Nicotine, Derris, Pyrethrum and Quassia) which are used chiefly as spring and summer washes for destroying insects with sucking mouth parts (Capsid Bugs, Leaf-Hoppers, Aphides, Scale Insects and Mealy Bugs) which, owing to their method of feeding, must be killed by contact with their bodies. The latter comprise the winter or dormant washes (tar distillates and petroleum oils), which are applied chiefly to deciduous fruit trees and bushes for the destruction of the eggs of such pests as Capsid Bugs, Aphides, Psyllids and Fruit Tree Red Spider.

It is not our intention to comment upon the relative merits of the several plant alkaloids used in contact washes other than to stress the value of quick-acting over slow-acting washes against Aphides, especially against those species with a high rate of viviparous reproduction during the spring and summer.

The success of contact washes depends upon their powers of wetting and spreading, so that a high-grade soft soap (*e.g.* horticultural potash soap) or other spreading agent of vegetable or synthetic origin must be incorporated with the wash.

The effect of certain plant alkaloids is to produce paralysis by their action on the nervous system. It has been stated that the rate of paralysis produced by a contact wash should not be taken as a criterion of toxicity. This statement may be true in some instances and against many pests, but it is not applicable in the case of Aphides whose specialized method of reproduction in spring and summer makes it

imperative that the insects are killed immediately by the spray fluid and before some, though restricted, viviparous reproduction occurs. The effect of a slow-acting wash in the case of many species of Aphides is that the wingless viviparous females become moribund and death may not ensue for some hours, during which period the females may be observed to produce healthy living young which continue to produce viviparously within a few days and which results in the formation of a fresh colony.

The toxic action of a contact wash on insects is such that either there is an interference with the respiratory system resulting from a mechanical plugging of the spiracles (breathing pores), the body tissues, especially those of the tracheae (breathing-tubes) being irritated and changed; or paralysis results from the nervous system becoming affected.

The tracheae and the tissues of insects contain sufficient oxygen to support life for several hours (MARTIN³), so that a slow-acting contact wash which does not produce speedy paralysis through its action on the nervous system is less effective than a quick-acting insecticide against insects that produce living young at regular intervals during certain phases of the life cycle.

The insect dies more slowly when the insecticide acts on the respiratory system than when the nervous system is affected and, though recovery of the adult viviparous female Aphides from the effect of the plant alkaloids mentioned is rare, the advantages of applying a quick-acting over a slower-acting insecticide against viviparous broods of Aphides are apparent.

Some insecticides suffer from an additional disadvantage when there is a ready but definite loss of toxic properties on exposure through carelessness in keeping the container air-tight and during prolonged periods of storage.

The chief plant alkaloids used in contact washes and dusts are now considered in relation to their effect on sucking insects, and upon Aphides in particular.

Nicotine still holds the field as the most effective and quick-acting insecticide. The chief disadvantage is its poisonous properties which forbid its use on ripening fruits and maturing vegetables, on salads and herbs, and its application to fruit trees in blossom owing to the danger of poisoning hive bees and other pollinating insects. This alkaloid acts as a fumigant in whatever form it is applied—the active agent being nicotine vapour, which passes into the tracheae of insects and paralyses the nervous system (MARTIN³).

Disappointing results with nicotine dusts (2, 3 and 4 per cent.) against insects are due to their application during low temperatures. The most effective control of insects, even of those species of Aphides which are protected from the action of liquid sprays within curled leaves, is obtained when the dust is applied at high temperatures (*i.e.* above 60° F.), so that the brightest and warmest period of the day should be chosen for dusting operations.

Derris or Tuba root is one of the best known of the non-poisonous preparations. It has been in use as a fish-poison for many years by the natives of Malaya, Dutch East Indies and other tropical countries.

Its action on insects is that the respiratory system is affected, while there appears to be little or no effect on the nervous system. It may act, also, as a stomach poison (MARTIN ³). Its somewhat slow action on the insect makes it specially desirable to take greater care in its application to Aphis-infested plants so that the insects are thoroughly wetted by the liquid. It is advisable to examine the sprayed plants in the course of a few days to ascertain whether there are signs of continued activity and breeding by any Aphides which have been born during the pre-period of death of their parents.

Pyrethrum is obtained from the flowers of *Chrysanthemum cinerarii-folium*. It is non-poisonous to man, while insects are affected rapidly by a paralysis of the nervous system so that death speedily follows its application to pest-ridden plants.

Quassia is obtained from the Jamaican Quassia tree, *Picraena excelsa*, and the Surinam Quassia wood, *Quassia amara*. It is likewise non-poisonous to man, while there is a specificity of effect on insects, some species being found to be affected, others being tolerant of this alkaloid. Insects sprayed by Quassia extracts die slowly through their effect on the nervous system, though there is no apparent paralytic effect. Aphides sprayed with such extracts become inactive and die in a state analogous to the "coma" of higher animals (MARTIN ³). It has been observed that wingless viviparous Aphides killed by Quassia extracts have produced living young during the period between spraying and death, but that in some instances the young so produced have eventually succumbed owing to the repellent action of Quassia residue remaining on the sprayed foliage. This repellent action is, however, of short duration, especially when rain follows the application, when the residue is washed off the leaf surface.

GENERAL RECOMMENDATIONS AGAINST APHIS INFESTATIONS.

Aphides attack a wide variety of garden plants, including deciduous and coniferous ornamental trees and shrubs; hedge plants; fruit trees and bushes; vegetables, herbs and salads; herbaceous plants, biennials and annuals; and a great number of glasshouse plants.

The general principles underlying the control of these pests have already been outlined, and include the destruction of their eggs on fruit trees and certain ornamental trees and shrubs (*e.g.* *Prunus* and *Pyrus* species) with the aid of dormant sprays (tar distillate washes), and the eradication of the active living Aphides during spring, summer and early autumn by means of contact washes and dusts. Under glasshouse conditions, fumigation with nicotine vapour or hydrocyanic acid gas should be a routine operation.

The following recommendations are given to aid the grower to avoid and to reduce attacks by Aphides on garden plants.

Fruit Tree Aphides. Winter Treatment.—Prevention is better than cure, and all fruit trees and bushes liable to attack by Aphides should be sprayed during the dormant season with a reliable tar distillate wash prepared according to the makers' instructions. Concentrations of 3 to 6½ per cent. are used, the lower concentrations to be used on tender-budded plants, *e.g.* Peaches and Nectarines, the higher on hardy fruits. Success will follow only when the wash is applied with considerable force and so thoroughly that every portion of the tree or bush is wetted by the spray.

Spring Treatment.—Fruit trees that do not receive a winter wash should be sprayed in early spring as soon as the Aphid eggs have hatched, and especially before leaf-curling commences, with a nicotine and soap wash (nicotine, 96 to 98 per cent.—½ to 1 fl. oz. ; potash soft soap—½ to ¾ lb. ; water—10 gallons). The wash should be applied thoroughly and forcibly through a coarse nozzle to all parts of the infested plant, more especially to the underside of the leaves and to the tips of the shoots. Nicotine is poisonous, and should not be applied directly or indirectly (through dripping from overhanging branches) to maturing vegetables, herbs, salads, ripening fruits, nor to plants in full bloom, owing to the danger of poisoning hive bees and other flower-pollinating insects.

Nicotine dusts (2, 3 and 4 per cent. nicotine) may be applied in spring and summer, and are specially effective in destroying Aphides sheltering within curled, twisted and rolled leaves. Better results will follow when the application is made during bright sunny weather when the temperature is above 60° F.

Non-poisonous washes—Derris and Pyrethrum—may be substituted as spring and summer washes, and are effective provided the application is thorough and the insects wetted by the liquid spray. The fact should not be overlooked that some non-poisonous washes (especially Quassia) are slow-acting and that some reproduction may occur by the viviparous female Aphides before their final extinction.

Vegetable Aphides.—Many vegetables, especially Brassicas (Cabbage and Brussels Sprouts), Broad Beans and Potatos, and Salads, especially Lettuce, are attacked by Aphides, infestations of which should be controlled as soon as they are seen and before vast colonies are produced and irreparable damage done to the plants. Poisonous washes and dusts (*e.g.* nicotine) should be applied *only* to young and *never* to mature plants, except in the case of attacks on the foliage of root crops, *e.g.* Potatos. Non-poisonous washes and dusts (Derris and Pyrethrum) may be applied to mature plants. Again it is necessary to stress the importance of directing the spray to the underside of the leaves, which is the favoured site for Aphides to congregate and feed. An early application results in the destruction of "ancestors," while delay will mean more severe and extensive injury by their "descendants."

Aphides on Ornamentals.—A great variety of plants are grouped in this category, including hedge plants (*e.g.* *Cupressus macrocarpa* infested with the Cypress Aphid) ; Conifers (*e.g.* Spruces attacked by

Spruce Aphis); ornamental trees (*Prunus* and *Pyrus* species attacked by Cherry Black Fly and Permanent Apple Aphis respectively) and shrubs (*Berberis* with Barberry Aphis, *Viburnum Carlesii* with *Viburnum* Aphis); herbaceous plants (e.g. *Aconitum* with the Larkspur Aphid, *Aquilegia* with the Columbine Aphid); Dahlias malformed by the Bean Aphid, together with *Tropaeolum* (Garden Nasturtium) which is another summer host of the same Aphid; and so on. There are numerous other ornamental plants in gardens which are the hosts of Aphides, and constant vigilance is required to avoid malformation of the foliage and flowers, stunted growth and loss of vigour.

General rules to be followed are: to direct the wash to the part of the plant infested, and to apply forcibly to ensure the thorough wetting of the insects' bodies; to avoid using poisonous sprays and dusts on ripening fruits, maturing vegetables, herbs and salads, and trees in blossom; to apply nicotine dusts during high temperatures; to bear in mind that some non-poisonous insecticides are slow in their action on the insects, so that a second application should follow in the course of a few days to avoid a speedy re-infestation of attacked plants; and to destroy weeds in beds and borders and in the vicinity of the vegetable garden so as to eradicate wild host plants of many crop-infesting species of Aphides.

Sincere acknowledgments are made to my colleague, Mr. F. C. BROWN, for the photographs illustrating this paper.

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THE AWARD OF GARDEN MERIT.—LXV.

292. *PENSTEMON ROEZLII*.

Award of Garden Merit, June 29, 1931.

The number of *Penstemons* in North America appears to be legion, even on a conservative estimate; those from the Eastern States are usually large plants suitable for the herbaceous border, but from the Central and Western States come smaller species more fit for the Rock Garden, and of these *Penstemon Roezlii* has been chosen to receive the Award of Garden Merit. It forms a low, 10-inch bush, plentifully covered with ruby-red flowers. Clay in the *Present-Day Rock Garden* says "The proper plant to bear this name is quite close to *P. heterophyllus*, but of inferior colour. *P. Roezlii* of some nurseries, and so many labels, is *P. (Menziesii) Newberryi*." Until the whole field has been re-surveyed, the tangle of nomenclature in this genus will not be

cleared up ; the matter is not made easier by the fact that *Penstemons* hybridize very freely, and so should not be propagated by seed unless a mixed progeny is required. But whatever its true botanical cognomen, the plant known as *P. Roezlii* can be very profitably introduced into the Rock Garden as one of the best of the smaller growing *Penstemons*.

293. DELPHINIUM 'BLUE BUTTERFLY.'

Award of Garden Merit, September 10, 1934.

The annual *Delphiniums* are very useful in the flower border and can also be used as pot plants for the decoration of the cold greenhouse. 'Blue Butterfly' is a compact bushy variety, not usually more than a foot high, bearing its deep blue flowers in great abundance. This variety received the Award of Merit as long ago as 1900 and is still to be found in seed catalogues ; in fact it is one of the many garden forms that has proved to be as good as it was expected to be when first produced (see Fig. 72).

294. SIDALCEA 'SUSSEX BEAUTY.'

Award of Garden Merit, April 1, 1935.

Although a *Sidalcea* under the name of *Sida malvaeflora* was figured in the *Botanical Register* (t. 1036) as long ago as 1827, it is only within the present century that the genus has come to the fore as an acquisition to the herbaceous border. The *Sidalceas* are natives of North America ; some are annuals, but those in cultivation (six or seven species) are herbaceous perennials ; they vary in height from 3 to 5 or more feet and are divided into three types according to the form of the inflorescence : (a) the *Grandiflora* type which has large flowers arranged in fairly compact spikes, (b) the *Stellata* type with starry flowers in loose, branched spikes, and (c) the *Multiflora* type with smaller flowers crowded towards the tops of the spikes. The colours vary from white through shades of pink to mauve and lilac. Hybridization has resulted in a number of improved forms and also in the extension of the flowering periods ; by choosing suitable varieties *Sidalceas* may be had in flower through June, July and August. The variety to which the Award has been given, 'Sussex Beauty,' is of the *Stellata* type with light rose-pink flowers $1\frac{1}{2}$ inch in diameter, and flowers in August.

295. ACONITUM FISCHERI.

296. ACONITUM NAPELLUS. VAR. PYRAMIDALE.

Award of Garden Merit, April 7, 1939.

The Monkshoods are decorative plants of considerable value in the garden, but it should be remembered that their tuberous roots are very poisonous, so that they should never be planted where they

could be dug by mistake as edible tubers, nor put in children's gardens. *Aconitum Napellus* is the chief source of the poisonous alkaloid Aconitine; the plant is very variable, the violet-blue flowers being of various shades and sometimes marked with white; it grows about 3 to 4 feet high and flowers in June and July; the variety *pyramidale*, to which the Award has been made, has a branched, rather compact spike of violet flowers. *Aconitum Fischeri* flowers in autumn; it is a taller plant with larger, pale blue flowers. Both these Monkshoods are suitable for the back of the herbaceous border or they can be grown amongst shrubs; they are not particular as regards soil but grow more luxuriantly if it is fairly rich.

297. *DIERVILLA* × 'ABEL CARRIÈRE.'

Award of Garden Merit, July 17, 1939.

The name *Diervilla* was at one time applied only to the plants of American origin, the Asiatic species being known as *Weigela*; later the two groups have been amalgamated, but it is the Asiatic species which have the greatest garden value, though the majority of the plants in gardens are hybrids, not true species. *Diervilla florida* has been the parent of a number of these hybrids and with *D. japonica* var. *hortensis* is probably responsible for the very vigorous, ornamental shrub 'Abel Carrière,' with rose-carmine flowers, yellow in the throat, which later turn red. This plant needs a rich moist soil and can easily be propagated by cuttings of half-ripened wood. The flowers are borne on lateral shoots produced on year-old branches; as soon as the flowers are over, these shoots should be removed, the young shoots of the current year being left untouched; this helps to keep the bush in good trim and prevent it becoming too crowded.

298. *CORONILLA EMERUS*.

Award of Garden Merit, November 24, 1930.

Several of the shrubby *Coronillas* are useful greenhouse plants, but *Coronilla Emerus* is probably the only one that can be considered really hardy in this country. It is a native of Central and Southern Europe and has been in cultivation in England since 1596. It forms a bush up to 6 feet or more high and as much in diameter; the deciduous leaves, 1-2½ inches long, are pinnate, the number of leaflets being 7-9. The flowers are borne in umbels of about three, on short stalks arising in the axils of the leaves, and are produced from May to October. The petals are yellow with reddish tips, and are characterized by having long claws; to the slender jointed pods the plant owes its common name of Scorpion Senna.

Any good loam and a sunny position will suit *Coronilla Emerus*; it is best propagated by cuttings of the soft or hard wood. There is an illustration in the *Botanical Magazine*, t. 445.

299. *ACHILLEA CLYPEOLATA.**Award of Garden Merit, April 7, 1939.*

The flat flower heads of the Yarrows are useful in providing a change of floral form from the more usual erect spikes of the flower border. Some are coarse and little better than weeds, but *Achillea clypeolata* is one of the better species; the flower heads are bright yellow, borne on stems about 18 inches high, above finely cut grey-green basal leaves—a smaller edition, in fact, of *Achillea Eupatorium*. Its size makes it suitable for the rock garden or the front of the herbaceous border; it is readily propagated by division. On its native limestone hills of Bulgaria it grows freely amongst *Spartium junceum* and *Dictamnus Fraxinella*—a combination that might profitably be repeated in the garden.

BORDER CARNATIONS AT WISLEY, 1941.

ONE HUNDRED AND FIFTY-TWO varieties of Border Carnations were grown at Wisley during the 1940-41 season; of these thirty-four varieties were grown for the first time, the remainder being composed of those which had been retained for future judgment and the Standard Collection—most of which have received awards—against which newcomers are tested. Most of the stocks—planted in the second week of October 1940—made good growth, in spite of the adverse weather which prevailed during the early months of 1941.

The Joint Committee of the Royal Horticultural Society and the National Carnation and Picotee Society met at Wisley and made their recommendations for Awards, as garden plants only, as given below.

The report indicates in their assigned classes the awarded varieties, those which have been retained for future judgment and those discarded.

WHITE SELFS.

The following variety has been retained for future judgment: CRAIGPARK WHITE (Grier).

The following varieties have been discarded: DEWDROP (Grier), BLANCH-FLEUR (Allwood).

PINK SELFS.

The following varieties have been retained for future judgment: CHARMING (Bath), PEACH BLOSSOM CLOVE (Allwood).

OLD ROSE SELF.

The following variety has been discarded: HARRIET HARROW (Charrington).

SCARLET SELFS.

The following variety has been retained for future judgment: BRIGADIER (Bath).

The following varieties have been discarded: CORONATION SCARLET (Maxfield), YEOMAN (Bath).

CRIMSON SELFS.

Ann Kirk (raised and sent by John Kirk, Esq., Knowesouth Gardens, Jedburgh). **H.C.** July 28, 1941.—Plant vigorous, of bushy habit ; stems stout, rigid, 24 inches high ; flowers double, 2½ inches diameter, centre full, dark crimson ; petals broad, almost entire ; calyx strong.

The following variety has been discarded : **MRS. EVELYN LAKE** (Allwood).

MAUVE SELFS.

Mauve Monarch (raised and sent by Messrs. Allwood Bros., Wivelsfield Nurseries, Haywards Heath, Sussex). **H.C.** July 28, 1941.—18 inches. Plant vigorous, bushy ; stems stout, rigid. Flowers 2½ inches diameter, full centred, deep rich heliotrope faintly striped with cerise ; petals broad, almost entire ; calyx strong.

The following variety has been retained for future judgment : **SCOTTISH MAUVE** (Allwood).

The following varieties have been discarded : **SELENE** (Faulds), **TERRINGTON** (Bath).

FANCIES.

The following varieties have been retained for future judgment : **AUTUMN TINTS** (Allwood), **ORIFLAME** (Allwood), **RAMESES** (Allwood).

The following varieties have been discarded : **BESSIE PRENTICE** (Grier), **EBORIAN** (Charrington), **MARGARET G. McDIARMID** (Grier).

WHITE GROUND FANCIES.

Scented Lady (raised and sent by E. Charrington, Esq., Ice Wood Cottage, Oxted, Surrey). **H.C.** July 28, 1941.—18 inches. Plant vigorous, of bushy habit ; flower stems long, stout, rigid. Flowers 2½ inches diameter, white ground edged and flaked with rose-red ; petals broad, entire ; clove scented ; calyx strong.

The following varieties have been retained for future judgment : **A. ST. CLAIR AMOS** (Allwood), **COTTAGE QUAKER** (Allwood), **JEAN M. FAULDS** (Faulds), **LUCY GLITTERS** (Allwood), **ROBIN THAIN** (Thain).

The following varieties have been discarded : **ELIZABETH POLLOCK** (Faulds), **INEZ BLAIR** (Thain), **KATHLEEN DAVIS** (Thain), **LADY MILNE-WATSON** (Baldry), **MARGARET BERESFORD** (Thain), **MERLIN CLOVE** (Gibson), **ROBUSTUS** (Allwood), **SADIE MERCER** (Thain).

YELLOW GROUND FANCIES.

Dainty (raised and sent by Messrs. Allwood Bros.). **A.M.** July 28, 1941.—Described **R.H.S. JOURNAL** 62, p. 464. (**H.C.** 1937.)

Shella Gibson (sent by Messrs. Allwood Bros.). **A.M.** July 28, 1941.—Described **R.H.S. JOURNAL** 62, p. 463. (**H.C.** 1936.)

Hilda Moody (raised and sent by R. Thain, Esq., Thatch Lossum, Shalford, Guildford). **H.C.** July 28, 1941.—2 feet. Plant vigorous, of spreading habit ; flower stems stout, rigid. Flowers 2½ inches

diameter, centre full, light sulphur-yellow ground pencilled and edged with bright scarlet; petals broad, almost entire; calyx strong.

The following variety has been retained for future judgment: **GEORGE BUCHAN** (Faulds).

The following varieties have been discarded: **C. PARKINSON** (Faulds), **CRAIG-PARK FANCY** (Grier), **DOWNS FAVOURITE** (Allwood), **FLORENCE GRISBY** (Allwood), **MARY G. ALLAN** (Grier), **ROBERT ANDERSON** (Faulds), **SUNSHINE** (Bath).

PICOTEES.

Firefly (raised and sent by Messrs. Allwood Bros.). **F.C.C.** July 28, 1941.—Described **R.H.S. JOURNAL** 64, p. 572. (**A.M.** 1939.)

Santa Claus (sent by Messrs. Allwood Bros.). **A.M.** July 28, 1941.—Described **R.H.S. JOURNAL** 64, p. 572.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1942.

Camellia reticulata 'Mary Williams.' **A.M.** March 17, 1942. This is considered by the exhibitor to be one of the finest of the several forms of *Camellia reticulata* raised from Forrest's later collections of seed around Tengyueh in Western Yunnan (No. 27165). The flowers are fully four inches across, with six to eight broadly ovate, notched petals of firm texture. The colour of the petals varies about crimson (**H.C.C.** 22/1) and rose madder (**H.C.C.** 23/1). The flower depicted at t. 9397 of the *Botanical Magazine*, drawn from a cultivated specimen of Forrest's No. 25352, although slightly smaller, is very similar in colour and form to 'Mary Williams.' Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Gorran, Cornwall. See p. xxxv.

Camellia × 'J. C. Williams.' **F.C.C.** March 17, 1942. The parents of this hybrid, which was raised by the late Mr. J. C. Williams at Caerhays, are a pale-flowered form of *C. saluenensis* (Forrest No. 24090) and *C. japonica*. The flower is four inches in diameter, with six or eight spreading or somewhat recurved petals of Phlox pink (**H.C.C.** 625/3) shading to fuchsine pink (**H.C.C.** 627/3) and a central cluster of golden stamens. The plant is remarkable for the freedom with which it produces flowers, the buds opening successively over a long period. See **JOURNAL**, 65, p. 217, Fig. 62 (1940). Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Gorran, Cornwall. See p. xxxiv and Fig. 67.

Camellia × 'Mary Christian.' **A.M.** March 17, 1942. This was raised by the late Mr. J. C. Williams from a cross between *C. saluenensis* (dark-flowered form of Forrest No. 24090) and *C. japonica*. The flower is cup-shaped, flattening later, about 3½ inches across, in colour Phlox pink (**H.C.C.** 625). Exhibited by C. Williams, Esq., M.P., Caerhays Castle, Gorran, Cornwall. See p. xxxv.

Cymbidium × 'Goura,' Charlesworth's var. **A.M.** March 17, 1942. This results from the crossing of *C.* × *Norrisii* with *C.* × *Alexanderi*.

The spike bore seven large flowers, which are white in the sepals and petals, while the labellum is tinged with pink and much marked with crimson spots and blotches. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. See p. xxxv.

Cymbidium × 'Olympus,' var. 'Invincible.' A.M. March 17, 1942. This elegant hybrid bore a spike of six large and well-formed flowers, bluish-white, the labellum profusely marked with crimson, the column rose-coloured. The result of crossing *C.* × *Alexanderi* with *C.* × 'Vesta.' Exhibited by the Stuart Low Co., Jarvis Brook. See p. xxxv.

Cymbidium × 'Rowena,' Castle Hill var. A.M. March 17, 1942. An attractive hybrid between *C.* × 'Rosy Queen' and *C.* × 'Coronet.' The spike carried ten well-formed flowers, deep pink, the labellum having a dark crimson blotch on the apical area. Exhibited by Major the Hon. H. S. Tufton, Castle Hill, Englefield Green. See p. xxxv.

Cymbidium × 'Roxana,' Castle Hill var. F.C.C. March 17, 1942. The elongated spike carried eleven flowers of bright greenish amber colour, while the somewhat lighter labellum has crimson markings on the apical lobe. This beautiful and distinct hybrid results from the crossing of *C.* × 'Laburnum' with *C.* × 'Pearl.' Exhibited by Major the Hon. H. S. Tufton, Castle Hill, Englefield Green. See p. xxxv.

Cypripedium × 'Golden Radiance.' A.M. March 17, 1942. This is a very distinct and beautiful Cypripedium, the well-formed flower being of almost uniform golden amber colour, with a bright sheen. The dorsal sepal has a white apical border. The result of crossing *C.* × 'Eldorado' with *C.* × 'Sunbeam.' Exhibited by the raisers, Messrs. H. G. Alexander, Ltd., Tetbury, Glos. See p. xxxv.

Cypripedium × 'Harmony.' A.M. February 17, 1942. This attractive hybrid is the result of crossing *C.* × 'Melody' with *C.* × 'Ruth,' and was raised in the garden of the exhibitor, Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. The flower is large and well-formed in all the segments, the dorsal sepal whitish, profusely spotted with purplish-maroon, the labellum and the expansive petals mahogany-red. See p. xxxiii.

Cypripedium × 'Hellas,' Westonbirt var. A.M. February 17, 1942. A very distinct and beautiful flower. The dorsal sepal is light reddish-brown with a broad white margin, the broadly formed petals fawn-coloured and glossy. The result of crossing *C.* × 'Desdemona' with *C.* × 'Tania.' Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury. See p. xxxiii.

Rhododendron × 'Olive.' A.M. February 17, 1942, as a hardy early-flowering plant. The flower heads are terminal, 1-2 flowered. The corolla is wide funnel-shaped, the lobes wavy, 1 inch long and 1½ inch wide; the colour is Mallow Purple (H.C.C. 630/2) with darker scattered spots on the base of the upper lobe. The leaves are elliptic apiculate, 1-1½ inch long, petiole ½ inch long, thick and leathery,

dark green above, paler below, with scattered scales. The young shoots are slightly scaly. Shown by Sir John Stirling Maxwell, Bt., K.T., Pollok House, Glasgow. See p. xxxiii.

Blackberry 'Merton Thornless.' F.C.C. September 16, 1941. (*Rubus rusticanus* var. *inermis* × *R. thyrsiger*.) An attractive garden variety as the plant does not possess spines. Fruit medium, round to slightly oval, drupes large. Colour, black, shiny. Flavour sweet, juicy, but not quite typical of the true Blackberry. Plugs easily, but slightly soft. Leaves medium, round to oval, tapering to pointed apex, downy below, and devoid of spines; margins sharply serrated. Trusses long, spineless. Exhibited by The Director, John Innes Horticultural Institution, Merton Park, S.W. 19.

Pear 'Packham's Triumph.' A.M. November 4, 1941. Reputed to be of Australian origin. Exhibited as a commercial and garden variety. Dessert, November. Fairly large, pyriform, uneven and bossed. Skin slightly rough. Colour pale golden-yellow, with russet dots and slight marbling. Eye wide open in a very shallow basin, segments erect. Stalk stout, half to three-quarters of an inch long, inserted in a shallow cavity. Flesh white, melting, juicy, with a very pleasant sub-acid flavour. Exhibited by Messrs. the Stuart Low Co., Bush Hill Park, Enfield.

BOOK REVIEWS.

"Vegetable Growing." By James Edward Knott. 8vo. 356 pp. Illustrated. (Henry Kimpton, London, 1941.) 3rd ed. 15s.

This is an American book, Dr. Knott being Professor of Truck Crops in the University of California, the good repute of which in its own country may be judged from the fact that this is the third edition. It is essentially a book for the commercial grower ("truck farming" is the American equivalent of our "market gardening") and the methods described can rarely be transferred unchanged to our very different climatic conditions. None the less it is a book that should be studied by our business producers, for the scale upon which many of the Americans work is immense, e.g. an irrigation farm of 750 acres devoted to Lettuce only. There has been so much more experimentation and research on vegetable crops in the United States than in this country that our growers will not fail to find material in this book that may suggest modifications of their own practice.

A. D. H.

"The Living Garden." By E. J. Salisbury. 8vo. xi + 232 pp. (G. Bell & Sons, Ltd., London, 1942.) 6s.

This is a new edition, and wonderful to say a cheaper one, of a book that has established its claim to rank as a classic. It is perhaps the best of all introductions to botany, the real botany that deals with the living plant, its structure and environment, and with the way that it contrives to maintain its existence in a competitive world. At the same time it is a scientific introduction to gardening, to enlighten the grower on the function of the parts of the plant and the principles that lie at the foundations of the craft of the practical man.

It is easy to read, it is sound, it is informed by recent research, and it is charmingly and originally illustrated. It is a book that ought to be in every garden lover's hands and made accessible to every young gardener.

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July 1942

THE SECRETARY'S PAGE.

New Fellows.—While the support given to the Society in these difficult times is very gratifying, Fellows are nevertheless specially invited to let their friends know about the privileges it offers and the advantages of joining it, and thus assist materially in making up the leeway which has necessarily resulted from war conditions. To maintain the work of the Society, continued, renewed and increased support is required.

Fellowship forms can be obtained on application to the Society's offices.

Monthly Shows.—A Show will be held on July 14 (12 noon to 6 P.M.) and 15 (10 A.M. to 5 P.M.) at which the National Carnation and Picotee and the National Sweet Pea Societies will also be exhibiting. At this Show there will be some classes for Lilies and also a competition for the Clay Challenge Cup offered to the raiser of a Rose of good form and colour, not in commerce before the current year, and possessing the true old Rose scent. Further particulars and entry forms of these competitions may be obtained from the Secretary.

A monthly Show will not be held in August, and the next one will take place on September 15 and 16, at which the National Dahlia and National Chrysanthemum Societies will co-operate.

Demonstrations at Wisley.—On July 15 and 16, from 2 to 4 P.M., there will be a demonstration in the Fruit Garden on Summer Pruning of Fruit Trees, and on August 19 and 20, from 2 to 4 P.M., a demonstration will be held in the Flower Garden of Vegetative Propagation of Plants. Would Fellows and their friends who intend to be present kindly inform the Director of the Gardens so that arrangements may be made.

The Society's Examinations.

General Examination (Juniors) held on March 12, 1942.—One hundred and forty-eight candidates entered for this Examination,

and of these 46 were placed in Class 1; 53 in Class 2; 30 in Class 3; 13 candidates failed; and 6 were absent.

A silver medal is awarded to Miss Nancy Muriel Smith, of 31 Richmond Road, W. Wimbledon, S.W. 20, who was First.

General Examination (Seniors) held on March 12, 1942.—Two hundred and sixty-one candidates entered for this examination, and of these 38 were placed in Class 1; 83 in Class 2; 81 in Class 3; 41 candidates failed; and 18 were absent.

A silver-gilt medal is awarded to Mr. Vincent Allen, of Alvin, Holywell Lane, Glass Houghton, Castleford, Yorkshire, who was First.

Teachers' Preliminary Examination in School and Cottage Gardening, held on March 21, 1942.—One hundred and sixty-five candidates entered for this Examination, and of these 42 were placed in Class 1; 45 in Class 2; 40 in Class 3; 21 candidates failed; and 17 were absent.

A silver-gilt medal is awarded to Mr. Lawrence Embleton, of 18 Fir Grove, South Shields, who was First.

Colorado Beetle.—The Minister of Agriculture and Fisheries asks that notice may be drawn to the Colorado Beetle. The risk of the introduction of the Colorado Beetle into this country is not likely to be less than in previous years, and it is of the utmost importance that any specimens of the beetle that may arrive in this country should be detected and dealt with before they have had time to multiply. The Ministry of Agriculture and Fisheries is accordingly anxious to obtain as early notification as possible of the discovery of the pest in this country.

Any yellowish beetle with black stripes or any red or reddish-yellow grub that is found feeding upon Potato leaves should be regarded with suspicion. When grubs or beetles suspected of being Colorado Beetles are discovered, specimens should be placed in a tin box (in which no holes should be punched) with a piece of Potato leaf, and the box should be sent to the Ministry of Agriculture, Plant Pathological Laboratory, 28 Milton Road, Harpenden, Herts., with a letter stating the exact place where the insects were caught and the name and address of the finder.

White Fly Parasite.—Owing to the unfavourable spring weather conditions the breeding of the White Fly Parasite has been retarded. Fellows' applications will be dealt with as fast as possible, but there must be some delay in supply. The demand is excessively heavy and the breeding of the parasite cannot be accelerated. Patience is asked for.

WISLEY IN JULY.

WITH the passing of midsummer a change in the aspect of the Gardens is perceptible. The large majority of the flowering trees and shrubs which earlier in the season brightened every corner have finished flowering and their foliage has assumed the deeper tones of maturity. In the list of features of attraction their places are taken by the herbaceous borders, daily increasing in beauty, and by extensive collections of horticultural varieties of several important genera. Among these, the Roses claim first notice. Beds of bush Roses, backed by a comprehensive collection of climbing varieties trained on posts, are to be found on either side of the broad walk which traverses the hillside.

In the Floral Trial ground at the lower end of the Rose garden, Delphiniums, Gladioli, Border Carnations and Pinks will be at their best; and here also is situated the Model Allotment cropped according to the recommendations of the Ministry of Agriculture, a feature appreciated by many who have but recently devoted part of their garden to vegetables. Those visitors whose chief interest lies in this side of horticulture are advised to visit the Vegetable Trial ground in Wisley village. Here they will see collections of culinary Peas, Carrots, Lettuce, Spinach and Turnips in, or approaching, the proper condition for use; and a trial of Potatoes whose individual cooking qualities will be investigated later. This trial includes some less familiar kinds specially recommended for salads. A collection of species and uncommon varieties of the Onion family has also been made.

During July the Herbaceous borders are at their best. In borders the size of those at Wisley there is room for an extensive range of plants, some of which may be considered too large, or not sufficiently distinguished, for smaller gardens. Thus, while the demand for masses of colour can be largely satisfied by modern varieties of *Helenium*, *Phlox*, *Sidalcea* and *Delphinium*, interest and variety are added by the use of such species as *Lysimachia punctata*, *Achillea Eupatorium* and *Anthemis Sancti-Johannis* in the yellow and orange colour-range; *Dracocephalum Stewartianum*, *Lactuca Bourgaei*, *Salvia* \times *superba* and *S. Sclarea* augmenting the blues; *Polygonum particulatum* and *Clematis recta* providing a not too dead white. The value of grey foliage is well illustrated by the species of *Artemisia* and *Eryngium*.

In Seven Acres the Heath garden is bright with the varieties of *Erica cinerea*, *E. vagans*, *E. Tetralix* and the forms of the common Ling, *Calluna vulgaris*. In their many shades of rosy purple and pink, or white, with variously coloured foliage, they contrast agreeably with the delicate yellow *Genista aethnensis* and the glaucous columns of *Juniperus communis* var. *compressa*. In the vicinity three good yellow-flowered shrubs may be noticed, namely, *Senecio laxifolius*, *Hypericum patulum* and *Potentilla fruticosa*, as well as a variety of later Spiraeas and Cotoneasters. At the edges of the pond, where the crimson Water-Lily 'Escarboucle' is conspicuous among paler varieties, the flowering Rush, *Butomus umbellatus*, and the blue Pickerel weed, *Pontederia cordata*, look well together.

Lilies are foremost among the attractions of the Wild garden this month. *Lilium pardalinum* with spotted, orange flowers, and the towering *L. superbum* are quite at home under the canopy of Oak and Birch; *L. Davidii* and the closely related *L. Willmothiae* and *L. x 'Maxwill'* all with orange-red, reflexed petals, are seen in fine condition in the less heavily shaded margins of the wood. The Giant Cowslip Primula, *P. Florindae*, is happiest with its roots in water or on the moist ditch-side, in association with *Campanula lactiflora* of palest blue. Rich colour is provided by clumps of the Madeira Orchid, *Orchis foliosa*, and the Willow Gentian, *G. asclepiadea*. Noteworthy shrubs flowering now are *Rhododendron auriculatum* and the hybrid *Eucryphia* \times *nymansensis* (*E. glutinosa* \times *E. cordifolia*), a fine ever-green shrub of rapid growth and erect habit.

Comparatively few of the good things to be found in the Rock garden can be listed here. Campanulas such as *C. arvensis*, *C. pulloides* and *C. Tomasiniana* are prominent, *Cyananthus lobatus* and *C. Sherriffii*

are producing their Periwinkle-like flowers, and the quaintly pencilled blossoms of *Codonopsis clematidea* and *C. ovata*, which repay close examination, overhang some of the higher rocks. *Delphinium tatsienense*, *Spenceria ramalana*, like a giant-flowered Agrimony, *Geranium Farreri*, *Primula alpicola*, with fragrant, white-powdered bells, all deserve mention. Numerous forms of *Iris Kaempferi* are in flower along the sides of the long pond, and the hybrid Astilbes form a rosy mist over the adjacent bog. The small rock-pools contain some of the less vigorous Water-lilies, such as 'James Brydon,' whose rosy-crimson cup-shaped flowers are seen in perfection here (see Fig. 74).

The genus *Campanula* is well represented in the Alpine house by *C. lasiocarpa*, *C. Zoysii*, *C. Piperi* and other species. Some uncommon alpine plants to be seen now are *Conandron ramondiioides*, fleshy-leaved with spreading racemes of lilac flowers; *Theropogon pallidus*, a Himalayan species with grassy foliage and pink flowers like Lily of the Valley (see Fig. 75); *Verbascum spinosum*, a small, thorny shrub unlike others of its genus; the dainty *Thalictrum kiusianum*, and *Aconitum cordatum*, a diminutive, dark blue Monkshood from the Himalaya.

THE WAR-TIME KITCHEN GARDEN.

JULY.

Late Sowing and Planting.—Spring is the time chiefly associated with seed sowing, but the gardener who wants a supply of vegetables throughout the year must not forget that there is still sowing to be done during summer and early autumn, when important crops will need to be sown to mature in the following spring. Many of the vegetables which are grown as annuals are really biennials or perennials, but selection and hybridization has produced stocks which can be treated as annuals and moreover can be induced to come to maturity at different periods of the year, depending on the time at which they are sown. Thus, by choosing suitable varieties, Cabbages sown in March (with the protection of a frame) will be ready for use in July and August; April-sown plants are available from August to October, whilst sowings made in May will produce a crop that can be used from November to March. And if Cabbages are wanted in April and May, a time when fresh vegetables are in short supply and those in store nearly used up, then they must be sown towards the end of July in the North and early in August in the South.

Cabbages are usually sown in nursery beds and planted out later into the rows where they are to mature; they can even be transplanted twice if necessary for it may not be possible to put them into their permanent quarters when they are becoming crowded in the seed bed, and if left too long where sown they will become drawn. But if a good, small Cabbage is required a quick-growing variety can be sown in the position where it is to mature, say after the early Peas or Beans are finished, in the first or second week in July; these will be ready for use in October and November. Various crops will be finishing their season during late summer and early autumn and, as space becomes available, the spring Cabbages can be planted out, the work beginning about the middle of September and ending about the middle of October, or even later if the weather permits and there are still young plants available.

Savoys, Sprouting Broccoli and Kales that were sown earlier should be planted out as they become large enough ; they are useful crops that will be valued in spring. Cauliflowers can be sown in September if provision can be made for protecting them during the winter, for, unlike Broccoli, they are not hardy. Spinach Beet can be sown in July for use during the autumn and the following spring, and Winter Spinach is sown in August. The Carrots to be lifted for storing will have been sown in May or June, but a sowing in July will provide roots for winter and spring use which can be left in the ground and pulled when wanted. Turnips, on the other hand, being a quicker growing crop, are sown in spring for use in summer, but those that it is intended to store are not sown till the end of July or early August. In September Turnips should be sown to provide the invaluable " tops " in April.

Onions need a long growing period and are hardy enough to come safely through an ordinary winter, so that it usually pays to sow some Onions in August ; these will be planted into their permanent quarters as soon as soil conditions are favourable in March or early April. Endives and Lettuces for early spring use that will be wintered in frames all form part of the autumn sowing programme, which is equally as important in its way as the spring programme.

Work to be done.—Successional sowings of French Beans, Beet, Shorthorn Carrots, Lettuce (in a cool border), Endive, Turnips and Kohl Rabi can be made this month. Cabbages for use in April and May should be sown towards the end of this month. The planting out of Kales, Savoys, Winter Cabbage, Sprouting Broccoli and Leeks should be continued. If the weather is very dry Celery, Marrows and Runner Beans will want watering. Outdoor Tomatos should have the side growths removed. Maincrop Potatos should be sprayed early in the month with Burgundy mixture as a preventive against blight. Shallots will be ready for harvesting this month.

Frames.—Keep Ridge Cucumbers picked so as to prolong the season. As space becomes available in the frames use it for Radishes, Spinach and Lettuces ; shade and moisture can be more easily controlled here.

Crops available from the garden in July.—Beet, Cabbages, Carrots, Cauliflowers, Dwarf Beans, Lettuces, Peas, Runner Beans, Salad Onions, Turnips and Potatos.

The Fruit Garden.—Apples and Pears will have completed the " June drop " by the beginning of this month when the final thinning is carried out. Thin the early ripening varieties such as ' Beauty of Bath ' and ' Mr. Gladstone ' first, doing the thinning gradually. While variety and vigour of the tree have to be taken into consideration when thinning, a general guide is finally to space the well-placed fruits of dessert varieties about six inches apart. The cooking Apples should be lightly thinned so that the larger fruits can be removed in a week or two's time to be used immediately, leaving the smaller fruits to mature and provide the crop for storing. Diseased and maggoty fruits should be removed when thinning. To prevent injury to the spurs or neighbouring fruits thinning is best done by means of scissors. Trees and bushes planted during the past winter should have any fruit they are bearing removed so as to give the trees every chance to become developed.

Summer prune restricted forms of Apples and Pears such as cordon, espalier, dwarf bush, etc. The time to start pruning varies with local

conditions, but generally speaking Pears are ready about the middle of this month and Apples about the end of the month. Summer pruning consists of shortening the side shoots back to about five leaves, but the extending shoot of each main branch is left unpruned. Spread the summer pruning over a period of ten days to a fortnight to avoid taking away too much foliage at one time and causing a check to the tree. This can be done by shortening the more advanced shoots first, gradually doing at intervals the less advanced ones as they develop. The purposes of summer pruning are to let sun get at the fruit, to keep the trees in shape, to reduce vigour, and to encourage the lower buds on the shortened shoot to plump up into fruit buds; this last purpose is a controversial one. The apical bud of the shortened shoot will sometimes grow out into a secondary shoot; this secondary shoot should be pinched out as soon as it appears.

By the end of the month the early and mid-season Strawberries will be more or less over and when the last of the fruit has been picked the bed should be cleaned. The litter is raked to the end of the rows, and the bed cleared of weeds. Dead foliage and the runners, unless required for propagation, are cut off. The ground between the rows is then lightly pricked over and a light mulch of farmyard manure applied. Plants selected for propagation must be healthy, vigorous and free from disease. All but four or five of the best runners are cut off. Prick up the soil around the parent plant and peg down the selected runners, pegging them down as far away from the parent plant as possible. Useful pegs can be made from thin wire bent in the shape of a hair-pin. Another method of layering is to peg the runners into 3-inch pots which have been filled with a good compost. The pots are plunged into the soil. Keep the runners watered and remove extension runners as they appear.

In the Muscat house the berries will just be starting to colour, so give a good watering which will supply the rods until the bunches finish; a light mulch of well-decayed farmyard manure will assist in preventing the border becoming dry before ripening is complete. Employ the box ventilator at night for 'Madresfield Court' to prevent the berries of this variety from cracking.

SCHIZOCODON SOLDANELLOIDES VAR. *ALPINA*.

FIG. 66 in the June 1942 issue of the JOURNAL showed a dwarf form of *Schizocodon soldanelloides*. The type is usually considered as a rock-garden plant, though actually it is a woodlander rather than a high alpine, but its low stature makes it suitable for the shadier parts of the garden and, though it has been considered difficult to cultivate, this is not the case if it is given conditions that it likes—that is a moist, shady position in lime-free soil—though it may be a little slow in getting established.

As long ago as 1893 its merits were recognized by the award of a First Class Certificate. In 1941 the alpine form, *S. soldanelloides* var. *alpina*, received an Award of Merit; it resembles the type but is smaller in stature and more intensely coloured, the flowers being a deep pink and the leaves and stems inclined to be red or reddish-brown. There is also a white-flowered form of this variety which is quite distinct and equally attractive. All forms are quite hardy, but they dislike lime, as most woodland plants do.

THE FOUNDERS.

THE RT. HON. CHARLES GREVILLE, F.R.S., F.L.S. (1749-1809).

By THE ASSISTANT SECRETARY.

IN the minutes of the meeting held on March 7, 1804, "at Mr. Hatchard's House [in Piccadilly] for the purpose of instituting a Society for the Improvement of Horticulture," the first of the seven names of those present is the "Rt. Hon. CHARLES GREVILLE." Although he does not figure in the *Dictionary of National Biography*, in which five of the others occur, this aristocratic amateur gardener, then in his fifty-fifth year, was by no means the least important of the founders of our Society. The treatment he has received illustrates SHAKESPEARE's lines :

"The evil that men do lives after them ;
The good is oft interred with their bones."

Almost all the references to GREVILLE in modern literature deal solely with his association with EMMA LYON, who subsequently became Lady HAMILTON and NELSON's mistress, and while, I think without exception, all the authors of the many books about that remarkable woman speak evil of GREVILLE, either through bias or ignorance, they leave unsaid much that was good about a cultured gentleman who was generally held in affectionate regard by his contemporaries.

Born on May 12, 1749, the Hon. CHARLES FRANCIS GREVILLE was the second son of FRANCIS, 8th Baron BROOKE and 1st EARL OF WARWICK of the GREVILLE family.* Nothing appears to have been recorded about his boyhood or education, but in his early twenties he was interested in science and, no doubt through his friendship with Mr. (afterwards Sir) JOSEPH BANKS, on February 13, 1772, GREVILLE was elected a Fellow of the Royal Society, to which BANKS had belonged since 1766, and of which he was President from 1778 till his death in 1820. GREVILLE's particular interest lay in minerals. In 1773 he acquired a large collection which had been formed by Baron IGNAZ VON BORN, of Prague, and continued to add to it throughout his life. Precious stones in their native condition had a special appeal to his artistic sense, and he got together a fine series of crystallized diamond, ruby, sapphire, emerald, topaz and rubellite. He also gave a good deal of attention to meteorites. The only paper which he appears to have delivered before the Royal Society was "An Account of some Stones said to have fallen on the Earth in France ; and of a Lump of Native Iron said to have fallen in India." In the course of time he gathered into his collection fragments of many meteorites, seven of which were not represented in the British Museum. Among other people with whom he corresponded about minerals was WARREN HASTINGS ; in a letter preserved in the *Hamilton and Nelson Papers* WARREN HASTINGS tells GREVILLE that a Mr. BOYLE is about to go to Bhotan, and he says, "I shall desire him to send me specimens of Earths, Stones, Crystals, Fossils & Minerals which I shall take care to forward to you by the first opportunity."

* He is not to be confused with CHARLES GREVILLE (1762-1832) or with his son CHARLES CAVENDISH FULKE GREVILLE (1794-1865) of the *Greville Memoirs*. They belonged to the FULKE GREVILLE family of Wilbury.

Upon the death of their father in 1773, GEORGE GREVILLE, CHARLES'S elder brother, was called to the House of Lords as 2nd EARL OF WARWICK, and his seat in the House of Commons becoming vacant, CHARLES entered Parliament as one of the members for Warwick on January 21, 1774. He also succeeded his brother as a Lord of Trade and continued to hold office until 1780. During the latter part of that period one of his colleagues on the Board was EDWARD GIBBON, then engaged in writing *The Decline and Fall of the Roman Empire*.

As already mentioned, CHARLES GREVILLE had a well-developed artistic sense, due no doubt in part to the influence of his uncle, Captain (afterwards Sir) WILLIAM HAMILTON, H.M. Ambassador at Naples, and a famous collector of antique art and pictures. In 1772 the Trustees of the British Museum had purchased, by means of a parliamentary grant, his collection of Greek vases, terra-cottas, ancient glass, bronzes, ivories, gems, ornaments and coins which formed the groundwork of the department of Greek and Roman antiquities and provided models for JOSIAH WEDGWOOD (the father of one of our founders). It was also Sir WILLIAM who acquired the huge Grecian marble krater known as the "Warwick Vase" and presented it to CHARLES GREVILLE'S elder brother to help him in his favourite pursuit, the embellishment of Warwick Castle. But GREVILLE'S interest was by no means confined to antique art. Paintings and engravings attracted him and he is said to have been instrumental in introducing into this country the process of aquatint engraving. The generally accepted story, taken from the *Library of Fine Arts*, ii. 344 (1831), is that he purchased the secret from JEAN BAPTISTE LE PRINCE and communicated it to his friend PAUL SANDBY, R.A., and it is certain that in 1775 SANDBY produced by this process (or perhaps an improved form of it) a set of twelve *Views in Aquatinta from Drawings in South Wales*, dedicated to the Hon. CHARLES GREVILLE and JOSEPH BANKS, Esq. But in *A History of Engraving and Etching*, A. M. HIND, writing in 1923, says that it now appears that P. P. BURDETT, of Liverpool, produced a few aquatints between 1771 and 1774, and that a MS. note of 1817, acquired by the British Museum with one of BURDETT'S aquatints, states that GREVILLE purchased the secret from BURDETT. Whichever version of the story is true, it seems that GREVILLE played an active part in bringing the process to public notice.

In 1774 GREVILLE and his friend BANKS were both elected members of the Society of Dilettanti, which included many of the leading art connoisseurs, and when in 1778 BANKS became Secretary, an office which he held for eighteen years, GREVILLE succeeded him as Very High Steward. The minutes of the Dilettanti record that when SANDBY applied for permission to reproduce the drawings of Athens which the Society had commissioned WILLIAM PARS to make, it was GREVILLE who was asked to see that the drawings were properly engraved. In 1777 Sir JOSHUA REYNOLDS, who belonged to the Dilettanti, undertook to paint two groups of members, and in one of these pictures, which represents seven members sitting over dessert, we have a portrait of GREVILLE when he was about twenty-six. He is shown sitting next to BANKS and J. C. CROWLE, the well-known lawyer and antiquary, and is clinking glasses with them. The other persons from left to right are : Lord MULGRAVE, F.R.S., perhaps better known as Captain PHIPPS, the arctic explorer ; THOMAS DUNDAS, M.P., afterwards created Baron DUNDAS ; the EARL OF SEAFORTH ; and the MARQUESS OF CARMARTHEN, F.R.S., who became Ambassador to

France and Foreign Secretary, and succeeded his father as DUKE OF LEEDS (see Fig. 77).

In 1780 there was a change of government and GREVILLE lost his post at the Board of Trade, but he was again returned to the House of Commons as a member for Warwick, and under the new NORTH administration he became a Lord of the Admiralty on September 6. In the following March, writing to his uncle, Sir WILLIAM HAMILTON, at Naples, he said, "We have just fired the Park Guns on the arrival of very important successes in the West Indies. The islands of St. Eustacia, Seba & St. Martins are among our possessions. Rodney on receipt of despatches from G. B. (which were among the first important ones I put my name to) without delay embarked troupes & sailed to St. Eustacia." And he went on to give an account of the action in which Admiral HOOD captured a complete convoy.

The beginning of 1782 found GREVILLE a bachelor of thirty-two, living in a small house in Portman Square. As we have seen, he moved in the best society and was already well known as a connoisseur and collector of fine engravings, choice little examples of sculpture in marble and bronze, antique coins and mineralogical specimens. He had a small capital of a few thousand pounds, £500 a year secured to him from the rental of his brother's estates, and his salary as a Lord of the Admiralty. But with a change of government his salary might disappear in a night, and although money was then worth at least three times what it is now, even with his salary his income was barely enough to keep up his position as an M.P. and support his hobbies. True he stood in high favour with his wealthy uncle Sir WILLIAM HAMILTON, to whom, during the latter's prolonged residence in Naples, he was extremely useful, for GREVILLE was able to keep him *au courant* with what happened at Westminster, in Mayfair and at Windsor; and, what was equally important, dispose advantageously of such *objets d'art* as the ambassador sent home from time to time. As Sir WILLIAM's only child had died in 1775, GREVILLE had every hope of inheriting his uncle's Welsh estate, but that distant prospect was useless for meeting current expenditure, and so he was still unmarried. A wealthy but plain bride had no appeal for him, and girls who were both wealthy and beautiful seldom married younger sons. Such was the setting for the opening of the scene in GREVILLE's life on which most authors have concentrated to the exclusion of all else.

In December 1781, EMY LYON, the strikingly beautiful but illiterate daughter of a deceased Cheshire blacksmith, who, although unmarried, was expecting to give birth to a child, was, for what she called her "giddy" ways, turned adrift without means of support by Sir HARRY FETHERSTONEHAUGH, under whose "protection" she had been living for about twelve months. In her distress, on January 2, 1782, she wrote an appealing letter in a cover which had been already addressed by the recipient in his own hand to "The Hon^{ble} Mr. Greville, Portman Square, London, M.P." The upshot was that about three months later this remarkably beautiful girl of sixteen, together with her mother, came to London to live with GREVILLE, who gave up his residence in Portman Square, and took a small house in Edgware Row which he furnished in the best taste of the period, beautifying its rooms with choice works of art which he had been collecting for some years with a connoisseur's discretion and financial prudence. I have been unable to trace the position of the house, for the local

authority's rate books of the period no longer exist, nor have I been able to discover a map showing Edgware Row, but it is probable that it was in the neighbourhood of Paddington Green, which, in the earlier part of the reign of George III, was more like a village green than a present-day London square. And in this semi-rural retreat GREVILLE and EMMA HART, as she called herself at this period, lived happily for the next four years, the housekeeping being well but economically managed by EMMA's mother. EMMA's child, who is supposed to have been the daughter of a naval officer, was left in Wales under the care of her grandmother, to begin with at GREVILLE's, and later at Sir WILLIAM HAMILTON's expense.

While EMMA undoubtedly loved GREVILLE, and was filled with remorse when she occasionally displeased him by little outbursts of vulgarity, he appears to have regarded her with the eye of an art connoisseur rather than that of a lover. But he treated her with great kindness, providing her with masters in music and singing, and encouraging her to read and to take an intelligent interest in such things as ancient coins, choice engravings and mezzotints. Soon after her arrival GREVILLE introduced her to ROMNEY, to whose studio in Cavendish Square she became a frequent visitor when GREVILLE was engaged in his parliamentary duties, and ROMNEY, who was captivated by her beauty, painted no fewer than twenty-four or twenty-five portraits of her.

Early in 1782 GREVILLE lost his post at the Admiralty and was out of office until the spring of 1783, when he was appointed Treasurer of the Household under the NORTH-FOX coalition and sworn of the Privy Council on April 9. A further political crisis occurred in 1784 and he relinquished his appointment. In the summer of that year, Sir WILLIAM HAMILTON, then a widower of fifty-three, came to England on leave and spent a good deal of time with his favourite nephew, both in London and on a visit which they made to the Welsh estate which Sir WILLIAM had recently inherited on the death of his wife. The ambassador was greatly attracted by the pretty "tea-maker of Edgware Row" and appears to have suggested that she should persuade GREVILLE to bring her out to Naples so that she might have her voice trained and obtain the advantages of foreign travel. On the termination of his leave the ambassador returned to Naples and for a time things went on normally, except that GREVILLE found it increasingly difficult to make ends meet. His uncle, who spoke from practical experience, advised him to marry an heiress, and GREVILLE came to the conclusion that the advice was sound and that, to use his own words, he had "no alternative but to marry or remain a pauper." As a result, in a series of letters written to his uncle in 1785 he unfolded a plan under which EMMA would be taken off his hands. The idea was that EMMA should be led to accept an invitation from Sir WILLIAM to spend a few months in Naples, on the understanding that in due course she would be joined by GREVILLE and return to London with him. EMMA, who knew nothing of the conspiracy, fell in with the arrangement, and in March 1786 she set out for Naples with her mother under the impression that before the year was out she would be back at Edgware Row. How EMMA stayed in Naples for some years, eventually becoming Lady HAMILTON and subsequently NELSON's mistress, has been related in numerous books, and many hard words have been written about GREVILLE's actions and motives as revealed in the *Hamilton-Nelson Papers* and embroidered by the authors' imaginations. But presumably EMMA was in a better position to

judge than those whose only knowledge of the matter has been derived from a certain number of letters read a century after they were written and assessed by the standards of the reader's day. It is true that when EMMA first realized, at Naples, that GREVILLE never intended to come and take her back she gave way to a violent outburst, but after she had had time for reflection her final verdict was evidently quite different, for she repeatedly wrote to him over a period of many years in the friendliest terms.

When GREVILLE was arranging for EMMA to go to Naples he wrote to his uncle: "My next door neighbour in Portman Square was *Ld. Middleton*, of Nottinghamshire. I had the good fortune to please them, & have cultivated their friendship. There is one son and 2 daughters. The eldest married last year, the youngest presented only this winter. You know me sufficiently to know that beauty & disposition are both requisites, & the youngest in both respects is beyond the reasonable mark for a younger brother. I understood their fortune to be 30, but since find the eldest had only 20,000. Such, however, to sensible people might be sufficient for the present, but it must be an impudent person who could propose it, being only possessed of an annuity of 500 a year, & some incumbrances. I have always avoided the least particularity, & considered it as impracticable, but also convinced that if I could secure any jointure, and shew any prospect in future, that a certain moderate provision for her, joined to the preference the old people have for me, might obtain their consent to become a suitor." Sir WILLIAM obligingly supplied a letter which intimated that he had made his nephew his heir, and armed with it GREVILLE obtained the consent of "the old people," but he was not the only suitor and in the following year the young lady became the *COUNTESS OF SCARBOROUGH*. Whether GREVILLE took that as a final settlement of his matrimonial plans does not appear, but he remained a bachelor.

As already mentioned, GREVILLE resigned his appointment as Treasurer of the Household in 1784, and an interesting sidelight on that subject is thrown by the *Memoirs of the Margravine of Anspach*, where the following occurs: "Sir William Hamilton's nephew, Mr. Charles Greville, . . . possessed, like his uncle, a superior mind, with an elegant taste for the fine arts, but which he had indulged too much for the narrow limits of his fortune. He was so much admired by the King, that when he went to lay down his office of Treasurer of the Household, (a place which was personally in the gift of his Majesty, unconnected with the Ministry,) the King urged him not to take so unnecessary a measure,—nor would his Majesty accept his resignation but with the greatest dissuasion. His high sense of honour was so great, that, although his friends added their persuasions to those of the King, he could not be induced to retain a place, when his sentiments no longer coincided with his duty. He withdrew immediately into private life; and in consequence of this retirement, many of his leisure hours were bestowed upon me." Although he was out of office, GREVILLE continued to represent Warwick in the House of Commons until 1790.

Further evidence of the "narrow limits of his fortune" at this time may be gathered from the fact that two years after EMMA had gone to Naples he was still unable to pay ROMNEY for the picture of her at a spinning wheel which had been painted for him. He wrote to ROMNEY: "I find myself daily so much poorer, that I do not see when I can pay for it, and I am already too much obliged to you

to avail myself in any degree of your kindness to me ; perhaps Mr. Christian might accept my resignation of it and pay for it, and give me the option of repurchasing it if the improbable event of my increase of means shall enable me to recover what I now lose with regret ; but I can make no condition, and I leave the full and entire disposal of it to you." The upshot was that Mr. JOHN CHRISTIAN paid ROMNEY 150 guineas for "The Spinstress," which, better known as "Lady Hamilton at the Spinning Wheel," was purchased at CHRISTIE'S by Lord NORMANTON in 1875 for 770 guineas. Later it was acquired by the late Lord IVEAGH and was one of the pictures bequeathed by him to the nation with Kenwood.

When Sir WILLIAM HAMILTON returned to Naples in 1784 he entrusted the care of his Welsh estate to GREVILLE. Writing in November 1941, Canon EDMUND HOWELLS, of Milford Haven, said : "Milford Haven (in 1784) presented great possibilities of becoming an important centre, similar to the Tyne and other large rivers. Charles Greville . . . with a master mind set to work in developing the estate, consisting then of only a few farms. . . . He got in touch with a Colony of Nantucket Whalers (in religion Quakers), and persuaded them to come to Milford Haven, and though the whaling business did not succeed, they did good work and may rightly be called the 'Builders of Milford Haven.' The town was laid out in American fashion in three long streets running parallel in terraces one above the other." As might be expected, there are many references to GREVILLE'S activities at Milford Haven during the sixteen years that preceded Sir WILLIAM'S recall to England. In 1785 GREVILLE reported that "the plan relative to the Irish and London Mail to Hubberston is actually established. . . . I have a plan to settle a colony of American fishermen at Hubberston, & to carry on the whale fishing from thence to south of Falkland Islands." For this Sir WILLIAM said he was "much obliged," and added, "One day that harbour will be better known, & Hubberston become perhaps as great as Portsmouth & Plymouth." In 1790 GREVILLE used his parliamentary experience to secure the passage of "An Act to enable Sir William Hamilton, Knight of the Most Honourable Order of the Bath, his Heirs and Assigns, to make and provide Quays, Docks, Piers and other Erections, and to establish a Market, with proper Roads and Avenues thereto respectively, within the Manor or Lordship of Hubberston and Pill in the county of Pembroke." How little Sir WILLIAM had to do with what is known as "the Hamilton Act" may be judged from the fact that in June 1790 he wrote to his nephew : "Tho' I do not understand thoroughly the nature of the act of Parliament you have passed for me, yet I see enough that it may be attended with great consequences." So GREVILLE sent him a copy of the Act, and wrote : "I am in town negotiating with the Public Offices the plan to carry it into effect. I solicit from the Treasury the lease of Govt. lands & the use of the limestone at the forts, which will make the works go on better and cheaper. I apply to the Admiralty to see if the Navy Board will not assist you to make a dock ; the Custom-house, I apply to make them build a Custom-house & houses for their officers, or allow you a rent equal to the interest of the money to be laid out on the plan they advise & adopt. I shall take other steps to invite individuals to lay out money ; all you will have to do, after the Inn, & a quay for the Custom House, & a market house is built, will be to grant leases to such persons as will build according to the plan to be laid down, which can only be done when I have the answer from

all the Boards ; but the place must become something considerable ; the arrival of the mail-coaches daily, the 5 packets, now permanently established with £1200 a year from Govt., a legal quay, the market must bring inhabitants, & no one at so small charge may have so fair prospect of doing much good to the country & to yourself. . . . I will lay the whole before you with plans, etc., whenever the result of my negotiations shall be known."

And so GREVILLE consistently pursued his plans, reporting progress at frequent intervals. Thus he tells his uncle that he has "got six Quaker families from America" ; that he hopes "this year to begin the establishment of a building yard for shipping on a scale to lead to great things" ; and that he has "undertaken for £2000 to build new lighthouses at the entrance of the harbour." But Sir WILLIAM, far away in Naples, was quite unable to visualize all that was happening. Writing quite typically in 1796, he said : "I have received your last satisfactory letter . . . I have sign'd, sealed, & returned the paper, but . . . I know no more of my affairs in Wales than the man in the moon" ; and he went on to complain that he was receiving no income from the estate, while his expenses in Naples were constantly increasing. However, when he returned to live in England and had had an opportunity of seeing things for himself, he wrote to GREVILLE, "My visit to Milford last year convinced me of the propriety of all your operations there."

After the departure of EMMA no doubt the activities of the societies with which GREVILLE was connected were a welcome relief from a tedious home-life. BANKS, who had been created a baronet in 1781, was now President of the Royal Society, and his friend became a Vice-President and a man of considerable influence in the affairs of that august body. When, in 1787, ERASMUS DARWIN was anxious that his son ROBERT, who had recently qualified as a doctor, should become a Fellow, it was to GREVILLE that he turned for assistance. In a letter to JOSIAH WEDGWOOD he said : "I have written to Mr. Charles Greville, who has spoken to Sir J. Banks on the subject. Mr. Greville desires me to write to my friends and says [*sic*] *He will receive their certificates* ; I don't well know what this means ; he writes in a great hurry and says I may expect success." And so the father of CHARLES DARWIN became an F.R.S.

The fine arts were a constant source of pleasure to GREVILLE, and he spent much time with fellow connoisseurs of the Society of Dilettanti. He figures in ZOFFANY's picture "A Nobleman's Collection" which was exhibited at the Royal Academy in 1790 and presumably painted in the preceding twelve months. It shows CHARLES TOWNELEY, the eminent collector of marbles and antiques, sitting in his gallery in conversation with H. D'HANCARVILLE, while in the background stands GREVILLE talking to Sir THOMAS ASILE. The picture is now in the Towneley Museum, Burnley, having been purchased with the aid of a donation from the National Art-Collections Fund at CHRISTIE'S in 1939 for 1,250 guineas.

Some indication of the esteem in which GREVILLE was held by his contemporaries may be gathered from one of his uncle's letters written in 1790, the year when GREVILLE lost his seat at Warwick. It runs : "I am on the whole not sorry you are out of Parliament for I think you will the sooner get an income, for the Fox party in my opinion, shou'd the King live, may be long before it will prevail. It is really [*sic*] hard at your time of life to be in your present state ; however, you are loved and respected by all that know you." Four years later

Fortune smiled on him ; on January 27, 1794, he became Vice-Chamberlain of the Household, and in January 1795 he returned to the House of Commons as member for Petersfield. Among those who were pleased at the turn of events was EMMA, now Lady HAMILTON, who wrote : " I congratulate you, my dear Mr. Greville, with all my heart on your appointment to the Vice-Chamberlainship. You have well merited it and all your friends must be happy at a change, so favourable not only for your pecuniary circumstances, as for the honner [*sic*] of the situation. May you long enjoy it with every happiness that you deserve. I speak from my heart. I don't know a better, honester or more amiable and worthy man than yourself ; and it is a great deal for me to say this, for whatever I think I am not apt to pay compliments."

As Vice-Chamberlain of the Household, an appointment which he held for ten and a half years, GREVILLE must have seen many interesting things. In that connexion two of his letters are worth quoting. On April 8, 1795, the PRINCE OF WALES married Princess CAROLINE OF BRUNSWICK, and in an account which GREVILLE gave to his uncle he wrote : " The invitations were limited to the Peers & their families, but the number was sufficient to fill the rooms so completely that [only] with difficulty we could make room for the R. Family ; but with their usual good-nature they accommodated themselves to the circumstances & a more brilliant mob could not be collected. . . . I had a great deal of the official duty, at least my share as V.C. I was taking the sacrament with the K. and R. Family at St. James's when she [Princess CAROLINE] arrived, & I was immediately after the K. returned from Chapel sent to congratulate the Pss. on her arrival. On the day of the marriage I was sent to conduct the B. & B'groom, from their apart. to the K. & Queen, and it was my duty with the Ld. Chamb. to conduct the Bride, then return to conduct the Prince, & then return to conduct the King, & thereby was never absent from any interesting part of the ceremony. Robert [his younger brother, who was an equerry] was equally lucky "—and the letter goes on to detail the part that ROBERT took.

Later in the year GREVILLE gave his uncle an account of the hostile demonstration which GEORGE III encountered when he opened Parliament. " I returned from Pembrokeshire last Wednesday, & at once entered into the bustle of London. Attended the Cockpit after dining with Mr. Pitt, and on the day following was at my station [as Vice-Chamberlain], which gave some opportunity to seeing [*sic*] the outrage which a set of scoundrels committed on Thursday as the King went & returned from the House. The concourse was unusual, & the mass was as usual civil, but a party took their station by the road, & following the coach made the effect of a continued outcry of insult and disrespect ; & between old & new Palace yard among various things thrown, one, from the appearance of the fracture, was a bullet, which at the moment it broke the glass the King said was a shot, probably from an air-gun, & the direction from a house adjoining the Abbey, opposite the waiting room of the House of Commons. The king was perfectly composed, & read his speech without any person uninformed being able to judge that all had not passed as usual, & it being certainly hazardous on his return, much was said when he unrobed, to which he only answered that they might suppose or propose, but that for his part he knew that there was a great disposer of all things in whom he trusted, & he resum'd his seat in the coach with

much composure. He received further insult on his return by a stone breaking another glass, & one came into the coach by the open window, & he took it out of his sleeve & gave it to the lord in waiting, as a memorandum of the civilities he had received on his going to the H. of Parl^t. I received him at St. James's, & witnessed the superior composure of H.M. & heard from him the unmerited insult he had received. He ordered the guard not to be dismissed before he should arrive at the Queen's house, & he set out as usual thro' the Park in his private coach. I saw the footmen beckon to the guards, which the press of the crowd rendered necessary, & they galloped up just as some persons had endeavour'd to overset the carriage, & another had said that they should pull him out. He arrived safe, & both Houses presented a joint address on the occasion, & the King signed in council yesterday a proclamation offering £1000 for every offender or abettor [*sic*] convicted."

In 1796 there was a general election and GREVILLE lost his seat at Petersfield. But although that terminated his parliamentary career, he found plenty to occupy himself in his duties as Vice-Chamberlain of the Household and in the development of Milford Haven. In the letter to his uncle in which he mentions that he is "not returned in this Parliament" he reports that "The Quakers have sent out one ship to the S. Seas this spring, & in about a month another will sail."

Having been ambassador at Naples since 1764, Sir WILLIAM HAMILTON was recalled in 1800, and accompanied by Lady HAMILTON and Lord NELSON he arrived in England in November of that year. The HAMILTONS took up their residence in Piccadilly, and as NELSON was a frequent visitor no doubt he and GREVILLE often met. Some of those who have sought to glorify Lady HAMILTON at all costs, including the expense of GREVILLE, have represented that the latter was despised by NELSON. Thus they have quoted a letter written to Lady HAMILTON in March 1801 in which the gallant but infatuated admiral said: "That other chap did throw away the most precious jewel that God Almighty ever sent on this earth." But later letters, written in less extravagant language and, therefore, perhaps more reliable, seem to show that, when he had become better acquainted with GREVILLE, NELSON modified his estimate. Thus in October 1801, in a letter to Sir WILLIAM HAMILTON, NELSON wrote: "If Mr. Greville is in town remember me kindly to him and to the Duke [of Hamilton?] and all our friends." And Sir WILLIAM, writing to GREVILLE (who had been indisposed) from the HAMILTON-NELSON *ménage* at Merton two months later, says: "We were all disappointed at not having the pleasure of seeing you here yesterday, and sorry for the cause. Whenever you can come, with ease to yourself, Lord Nelson desires me to tell you that it will give him the greatest satisfaction. He really loves you." In July 1802 the HAMILTONS made an extensive tour, the chief purpose of which was to inspect the works which GREVILLE had been carrying out during the preceding ten years at Milford Haven. NELSON, his clergyman brother, sister-in-law and nephew, were of the party. On August 1, to celebrate Sir WILLIAM's reappearance among his tenants, and at the same time mark the anniversary of the Battle of the Nile, GREVILLE arranged a dinner at Milford and invited all the leading people of Pembrokeshire. NELSON, who was among those who made speeches, drew attention to the magnificence of the harbour.

Sir WILLIAM HAMILTON died in April 1803, and to GREVILLE, his

sole executor, he left more than £7,000 and his Welsh estate. During his lifetime he had assigned all the furniture and goods in his London house, in trust, for Lady HAMILTON, and in his will he bequeathed to her a legacy of £800 and an annuity of £800 charged on the Welsh estate. So, in the evening of his life, GREVILLE was relieved of financial worries.

When GREVILLE began to take an interest in gardening is not clear. His friend BANKS had been a keen botanist since he was a lad at Eton, and in 1779 he had bought Spring Grove, Heston, where there was a large garden which he promptly started to develop. GREVILLE was a frequent visitor at Spring Grove, and it may have been what he saw there which made him want to form his own collection of the many beautiful new plants which were coming in from New Holland, China and elsewhere. The garden attached to the house in Edgware Row was probably not large enough to do much, for it was kept in order by a jobbing gardener. The weekly payments made to him may be seen in the housekeeping account kept by EMMA during the winter of 1784-85; they varied from 1s. 9d. to 3s., and sometimes he did not turn up at all for three or four weeks. Presumably it was to this garden that Sir JOSEPH BANKS referred when in his "Notes on the first appearance of *Aphis lanigera*" (American Blight) in our *Transactions*, Vol. II, p. 164, he wrote: "Aug. 20, 1791. I this day visited a house Mr. GREVILLE had lately hired at Paddington, and found in the small garden annexed to it, an infinite number of the insects on the espalier Apple trees." Incidentally, he added: "Dec. 19, 1791. Mr. GREVILLE, in conversation this day, suggested the expedient of white-washing trees completely over, in winter time, after they have been pruned, as likely to destroy this insect; and told me that it had been found a decisive remedy against moss, by a gentleman who tried it in Pembrokeshire."

At or about Michaelmas 1790, GREVILLE moved to a rather larger house a short distance away at the north-west corner of Paddington Green. Here there was more room for his cabinets of minerals and curios, and for his pictures and other works of art. Moreover there was a larger garden. The house still stands and now bears on the fanlight over the door the name "Greville House." Unfortunately the garden has gone, its site being now occupied by a large, covered, commercial garage. When I visited it last September, the only plants, apart from a few annuals in window-boxes, were two Passion-flowers with which one of GREVILLE's successors has embowered a ground-floor window.

When GREVILLE was starting his collection of minerals, in 1773, he mentioned what he was doing in a letter to his uncle, and when replying Sir WILLIAM HAMILTON said, "You are like me, & don't like to do anything by halves." That was certainly true of the way GREVILLE took up horticulture, so that, in the words of Sir JAMES SMITH, the then President of the Linnean Society, in his "garden at Paddington the rarest and most curious plants, from various climates, were cultivated with peculiar success, and always devoted to the real advancement of science." Yet, although GREVILLE probably started gardening in earnest in 1790, it was not until 1802 that he joined the Linnean Society. It seems probable that his delight in his garden was that of a connoisseur of beautiful plants, rather than that of a botanist.

At least fourteen of the coloured plates in the *Botanical Magazine* and similar works were painted from specimens in GREVILLE's garden,

and he is credited by contemporary writers with the introduction of eight plants. One of the latter, well known to present-day gardeners, is *Lilium concolor*, of which SALISBURY, who gave the plant its name, wrote: "One of the rarest species of this gaudy genus, and so far as I know in no other collection yet than the Right Hon^{ble} Charles Greville's, who does not know from whence he received it." Another was a more or less double, rose-coloured form of the Tree Paeony, now called *P. suffruticosa rosea* and figured in LODDIGES'S *Botanical Cabinet* as t. 1035. A third was a semi-double, red variety of *Camellia japonica*. In ANDREWS'S *Repository* it is stated that "The largest plant now in Europe, of this variety, is in the select and most valuable collection of the Hon. T. [sic] Greville, Esq., Paddington, imported last year from China in the highest perfection." Others were *Adina globifera* which "came up in the earth of some plants sent from Canton to the Rt. Hon. Charles Greville"; *Clinogyne dichotoma*, of which SALISBURY wrote in 1812 that it was purchased "at the sale of the plants of our late Treasurer" who "received seeds in 1804"; the purple-flowered Magnolia recently rechristened *M. liliflora* var. *gracilis*, and still more recently saddled by the rules of nomenclature with the misleading name of *M. quinquepeta*; *Magnolia annonaeifolia* Salisbury, now called *Michelia Figo*; and a good rosy-pink, semi-double form of *Prunus japonica* which REHDER calls var. *Kerii* and thinks is "probably not now in cultivation."

While GREVILLE did not introduce the well-known Orchid *Vanilla planifolia*, he was the first to flower it, and the two coloured plates which were made from his plant bear out the statement in the *Botanists' Repository* that it was "the finest specimen in England." At the other extreme was the dainty *Diapensia lapponica*, of which SALISBURY wrote: "This curious little shrub is now flowering in the collection of the Right Hon. Charles Greville who received it from Labrador." One of the first specimens of the variety of Tree Paeony called *Banksii*, introduced by Sir JOSEPH BANKS in 1789, also found a home at Paddington, where GREVILLE grew it with great success, as may be gathered from the *Botanical Magazine* for 1809, where, under t. 1154, we read: "The finest specimen we have seen, and from which our drawing was taken, is at Mr. Greville's at Paddington, where it is planted in the ground, and has a glazed building erected over it without flues. This plant bears a profusion of blossoms; it does not rise very high, but divides into several branches near the ground, and, spreading in a circular form, measures about nine yards in circumference." Among other plants of his preserved in coloured plates are *Magnolia denudata*, *Phyllodoce coerulea*, *Hibiscus heterophyllus*, *Bryophyllum pinnatum*, *Crossandra undulaefolia*, *Gynura bicolor*, *Swainsonia coronillifolia*, *Epilobium latifolium*, *Curcuma aromatica*, *Centrosema virginianum*, *Gladiolus tristis* and *Gardenia Thunbergia*.

Some references to GREVILLE'S gardening activities occur in a letter written to BANKS on September 1, 1800. The copy in the Natural History Museum runs: "... my Garden solicits [sic] your decision: whether I may call on Smith [Sir JOSEPH'S gardener] and settle for the supply of one or two Loads of Loam. You was so good as to tell me I might talk to him about the Time which suited his employment of the Team. . . . I did not say anything about it when last at Spring Grove with you. I have wrote to [Lord] Seaforth about Peter Good: and I make no doubt he will be engaged; but I will write as soon as I receive his answer—I wish he had been going to N. America,

as Seaforth will undoubtedly do what he can, and is very active; but in the West Indies the whole of its productions are above my management or means: therefore I resign all my share to Kew and your disposal."

PETER GOOD was a foreman at Kew who had recently brought home a collection of plants from Calcutta. As the result of GREVILLE's influence with Lord SEAFORTH, GOOD accompanied ROBERT BROWN, the botanist, on the *Investigator* when it sailed under the command of Captain FLINDERS in the following July to explore the eastern coast of Australia. GOOD collected over 500 sorts of seeds and many herbarium specimens on this ill-fated voyage, and unfortunately he never returned but died at Botany Bay.

It is not known from whom GREVILLE first heard of the proposal to form a horticultural society. In all probability Sir JOSEPH BANKS discussed the idea with him from time to time during the thirty-two months which elapsed between the time when JOHN WEDGWOOD originally made the suggestion and the inaugural meeting which was held at HATCHARD'S book-shop in Piccadilly on March 7, 1804. In any case, in the minutes "the Rt. Hon. Charles Greville" heads the list of the seven people who attended and passed the resolution which gave our Society its birth. And when, in the following May, the first Council was elected, he was one of its twenty-one members. At the July meeting, the President, Lord DARTMOUTH, announced the names of the six Vice-Presidents he had appointed, among whom was GREVILLE. The first Treasurer was JOHN WEDGWOOD, but after two years, finding that he was frequently unable to attend meetings, he resigned, and at the Anniversary Meeting in 1806 he was succeeded by GREVILLE, who continued to be Treasurer until his death. After a time it was decided that the Society would be able to carry out its objects more efficiently if it were granted a Royal Charter, and at a meeting of the Council on April 5, 1808, Lord DARTMOUTH, Sir JOSEPH BANKS, GREVILLE and R. A. SALISBURY "were unanimously appointed a Committee to conduct the whole of the business" connected with the Charter. About the same time it was considered expedient that the Society should have a medal which it could award, and on May 3, 1808, the Council resolved that the President, BANKS and GREVILLE "be a Committee to get such a Medal executed for the Horticultural Society as they may approve, with all possible dispatch." The last time GREVILLE attended a meeting of the Society was on December 5, 1808, when he was in the Chair, and on the same day he presided at a meeting of the Council.

Mr. H. J. W. WILSON, the courteous Librarian of Paddington, was good enough to search the Borough records for information about GREVILLE. The first reference is in connexion with the census of 1801, when his household was returned as consisting of one male and two females. There is a Vestry minute dated September 23, 1805, to the effect that a letter was received from the Hon. CHAS. F. GREVILLE enclosing "a plan for a proposed improvement of the Green," and that as a result GREVILLE was asked to co-operate with the Vicar and Churchwardens in treating with the parties concerned. That he doubtless did, for it is recorded that at a meeting on September 22, 1807, GREVILLE, who does not appear to have been a member of the Vestry, produced a draft agreement between the lessee of the land and the Trustees appointed by the Vestry, which was duly approved, and at the same meeting it was decided to lay a four-inch drain on the north

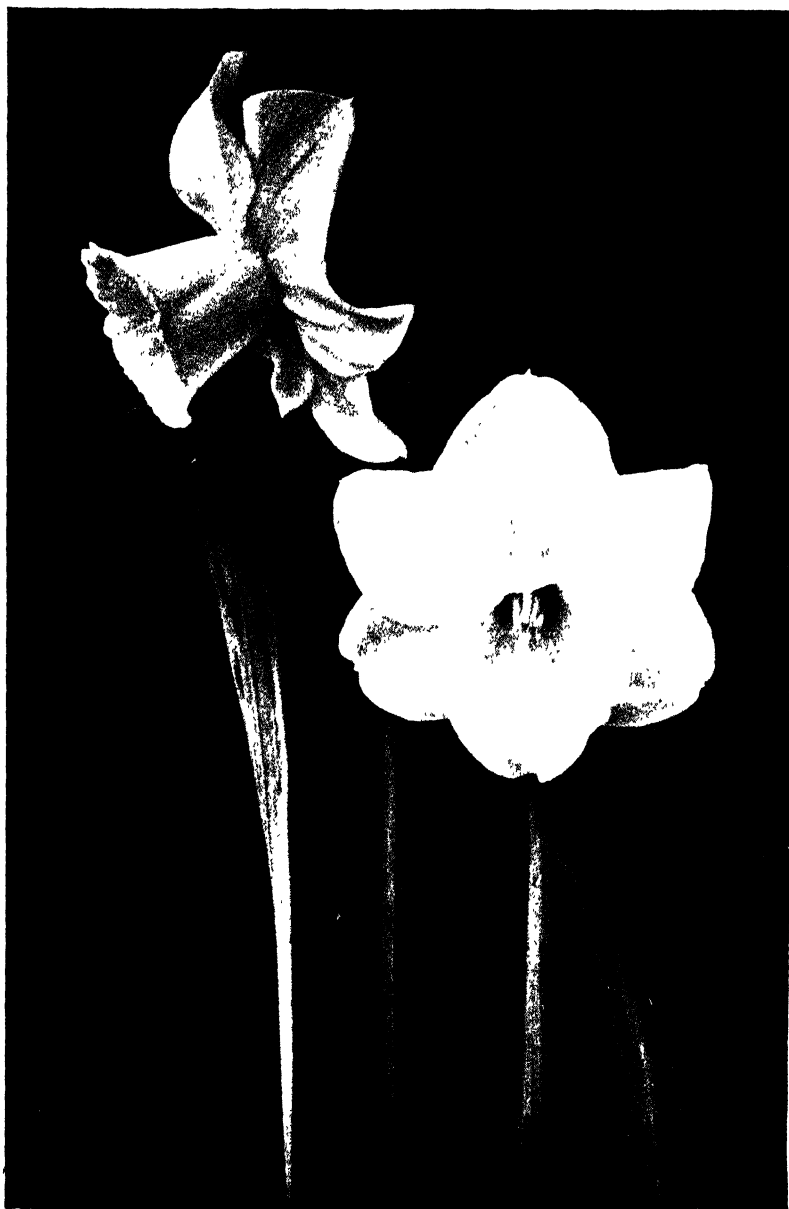


FIG 73.—NARCISSUS 'MURMANSK'
Best flower in the competitive classes at the Daffodil Show, 1942.



Photo, N. K. Gould

FIG. 74.—*NYMPHAEA*. JAMES BRADON, IN ROSE-GARDEN POOL, WISLEY
SEP. 10, 2100.



Photo. N. K. Gaudet

FIG. 75.—*THEROPOGON PALLIDUS*
(See p. 216.)

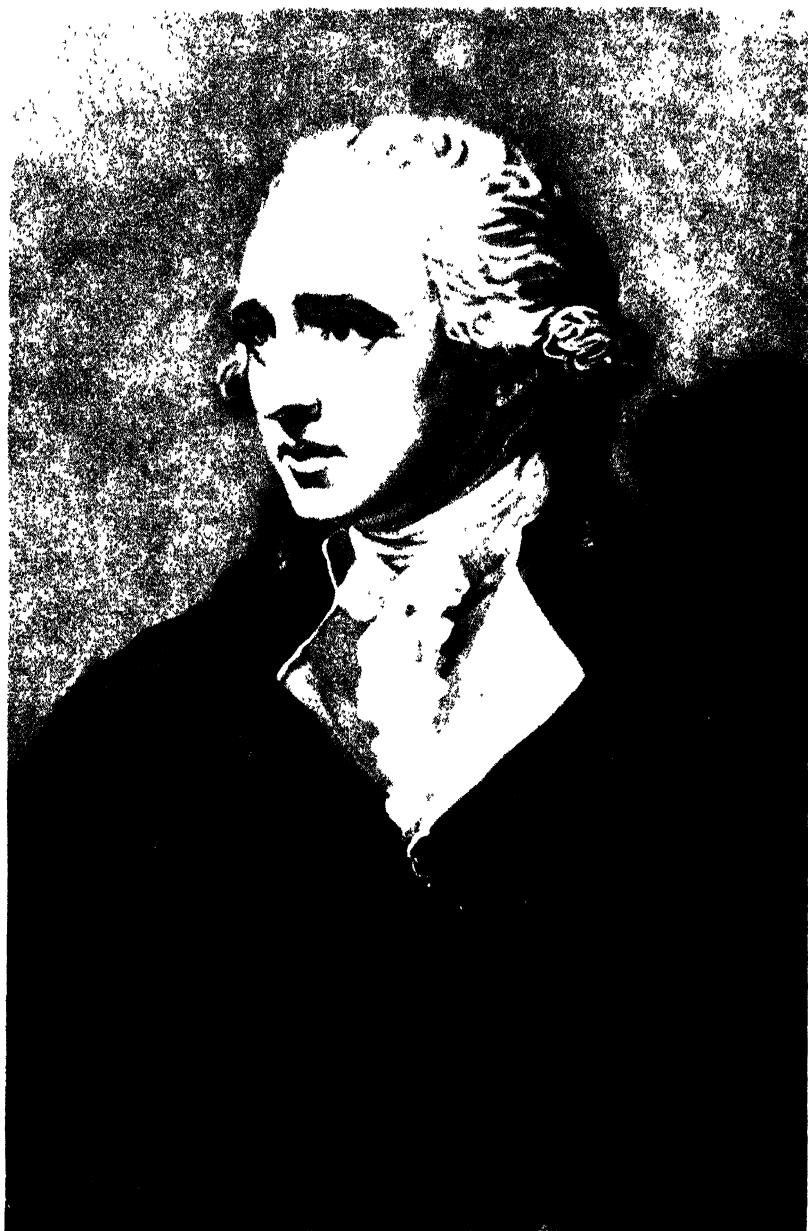


FIG. 76.- THE HON CHARLES GREVILLE
H Meyer's mezzotint of Romney's portrait. (See p. 232)



FIG. 77 DILETTANTI SOCIETY GROUP

By Sir Joshua Reynolds

Reproduced by kind permission of the Society of Dilettanti

(See p. 220)



FIG 78 —A VIGOROUS H.T ROSE BEFORE PRUNING
(PORTADOWN)
(See p. 237)



FIG 79 —A VIGOROUS H.T ROSE AFTER PRUNING
(PORTADOWN)
(See p. 237)



FIG 80 - A MODERATELY GROWING H T ROSE
BEFORE PRUNING (MABEL MORSE)
(See p 238)

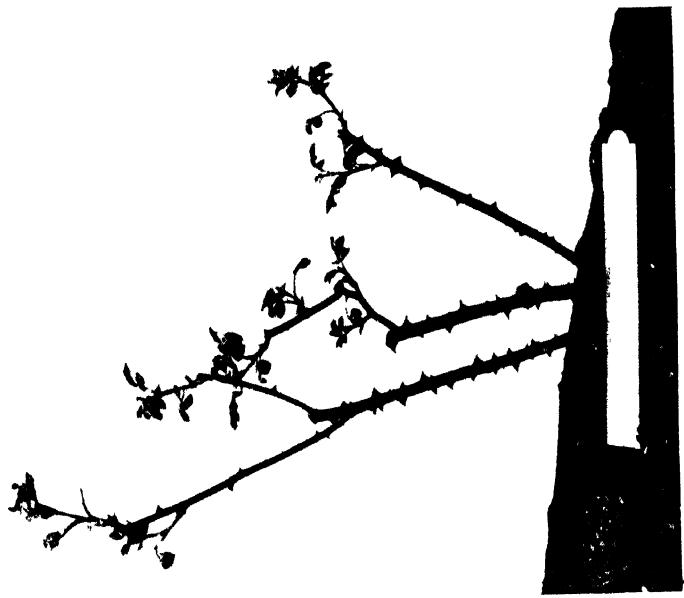


FIG 81 - A MODERATE GROWING H T ROSE
AFTER PRUNING (MABEL MORSE)
(See p 238)



FIG. 82.—NARCISSUS 'COTOPAXI'
A.M. April 14, 1942

side of the Green, for which GREVILLE offered to supply a quantity of bricks.

The last of GREVILLE's letters which seems to have been preserved was written at Milford on September 20, 1808, to BANKS. It begins : " I am sorry to hear that Bligh has been deposed . . . I fear the plans against [him] have been extensively laid and artfully conducted ; certainly prejudice has been more barefaced than in any case I ever saw. If I could do anything I would, willingly ; but not having heard from him, & being so far from London, I can do nothing." This was " Bread-fruit Bligh " who, having sailed round the world with COOK, and been captain of the *Bounty* at the time of the mutiny, had been forcibly deposed from his post as Governor of New South Wales in January 1808 by a Major GEORGE JOHNSTON. The latter was subsequently cashiered for his part in the affair, while BLIGH became a Vice-Admiral of the Blue.

But GREVILLE, then in his sixtieth year, was beginning to break up. The letter goes on : " I am at present looking to my retreat to London with trepidation, having been fatigued by my journey ; but since my arrival [I am] certainly in many respects better ; but this has been owing to the kindness of Ld. & Ly. Cawdor [at Stackpool Court, Pembrokeshire], where I have been allowed every indulgence of quiet, amidst the luxury of hospitality & of fine air. . . . being at Melford (? Milford *) to settle business, I feel myself anxious and unfit for it ; therefore hope to be able to run away before I am knocked up."

In due course he returned to his home at Paddington Green, where, in the following spring, he had the satisfaction of learning that the Horticultural Society's Royal Charter had been granted to, among others, " Our Right Trusty and well-beloved Counsellor, Charles Greville." Six days later, on April 23, 1809, he passed away. His remains were deposited in the family vault under St. Mary's Church at Warwick.

GREVILLE died intestate and it became necessary to realize his property for division amongst his next of kin. As a result, the *Gentleman's Magazine* for June 1910 stated that " In pursuance of a Petition to the House of Commons, from the Trustees of the British Museum, Mr. Greville's Minerals have been valued by Drs. Babington, Wollaston, C. Hatchet, Esq. and four other gentlemen," who reported " that the value of the whole [collection] is £13,727, including that of the Cabinets, which cost £1600." In September the same periodical said : " Mr. Greville's magnificent Collection of Minerals, lately purchased by Parliament, is already removed to the Museum." According to the official *History of the Collections* contained in the Natural History Museum, " The Greville collection eventually became the finest assemblage of minerals which had been seen in England, and was declared by English mineralogists and Count de Bournon in 1810 to be in most parts equal, and in many points superior, to the best Continental collections." The collection consisted of about 20,000 specimens, but only about 14,800 were purchased for the Museum, the faceted precious stones having been disposed of separately.

The genus *Grevillea* was named in honour of our founder, a few months before his death, by ROBERT BROWN, who wrote : " This extensive genus . . . I have dedicated to the right honourable Charles Francis Greville, one of the Vice-Presidents of the Royal Society ;

* The Banksian Correspondence in the British Museum consists of copies of the letters, and the mistake may be the copyist's.

a gentleman eminently distinguished for his acquirements in natural history, and to whom the botanists of this country are indebted for the introduction and successful cultivation of many rare and interesting plants."

ROMNEY painted GREVILLE's portrait, probably in 1787, when he was about twenty-eight. It is not known whether the picture still exists, but a mezzotint engraving of it, made by H. MEYER in 1810, has recently been acquired by our Society, and it is reproduced in Fig. 76. It is hoped that one day the original will be discovered and presented to the Society, so that the Rt. Hon. CHARLES GREVILLE may rejoin his friend Sir JOSEPH BANKS who (in peace-time) from his place over the mantel-shelf still watches with a fatherly eye over the deliberations of the Council to which they both used to belong.

THE AWARD OF GARDEN MERIT.—LXVI.

300. *ERICA AUSTRALIS* 'MR. ROBERT.'

Award of Garden Merit, April 21, 1941.

301. *ERICA CARNEA* 'SPRINGWOOD WHITE.'

Award of Garden Merit, November 12, 1940.

Those gardeners whose soil is lime free and who are attracted by flowering Heaths will find the two varietal forms of well-known species, which have recently received the Award of Garden Merit, well worth including in their collection.

Erica australis is a shrubby Heath, usually about 3 to 4 feet high with bright purple-red flowers; the variety 'Mr. Robert' is a form with pure white flowers but otherwise resembles the typical species. It was found wild by Lieut. ROBERT WILLIAMS, son of Mr. J. C. WILLIAMS of Caerhays, after ten days' hard searching in the mountains near Algeciras, southern Spain, and was named after him. It flowers very freely and appears likely to stand rigorous winters rather better than the type.

Erica carnea 'Springwood White' is another white form of a well-known Heath, in this case one that does not object to lime as strongly as most of the family do. It forms a low spreading bush, some eight to ten inches high, the fine white flowers being very freely produced. The variety was found wild on Monte Carraggio, Italy, by Mrs. RALPH WALKER of Springwood, Stirling, and the name was originally 'Springwood'; it became 'Springwood White' on the appearance of another variant called 'Springwood Pink.'

302. *MALVA ALCEA*.

Award of Garden Merit, June 17, 1935.

Malva Alcea is a European native which makes a good show in the herbaceous border; it grows usually about 2 feet high, or may be rather taller, and has leaves cut into five segments; the flowers vary in colour from deep rose to white and are about 2 inches across. The plant is perennial and will grow in any good garden soil; it can be propagated by division or by seed. It is figured in the *Botanical Magazine* t. 2297.

THE SCIENCE OF GROWING ROSES.

By S. C. BRADFORD, D.Sc.

Oh ! no man knows
Through what wild centuries
Roves back the rose.

DE LA MARE.

I. INTRODUCTION.

THIS paper is designed to give a connected account of a method of cultivating Roses with very little pruning, based on our present knowledge of the life-processes of plants and on experiments carried out on heavy and light soil during the last twenty-five years or more.

The method of long pruning herein described is not new. As long ago as 1869, in the time of CHARLES DICKENS, WILLIAM GARLEY wrote in the *Gardeners' Chronicle*: "I distinctly demur to the suggestion that by cutting Rose shoots down to the lower eyes, better blooms are likely to follow upon such shoots than if other eyes near the apex were left. . . . There are few who have not actually seen . . . Roses enrobed in all the magnificence, which liberal extension tends to develop, who will be able to form any conception of the wonderful profusion of bloom of which they are capable."

Perhaps the earliest description of approved conditions for growing Roses is that given by PLINY, who says: "The Rose bush loveth not to be planted in a fat and rich soil . . . but agreeth with a light and loose kind of earth and principally with a ground full of rubbish, and among the ruins of old houses . . . There is no Rose bush whatsoever but prospereth the better for cutting, pruning, yea and burning. Moreover, it loveth to be removed and transplanted." This quaint bundle of paradoxes, written two thousand years ago, shows that hard pruning was in vogue even at that time. Yet even so long ago, it had been observed that Roses did best when allowed to grow naturally, the good results being attributed to poor soil among ruins instead of to freedom from the knife. Similar observations occur at later dates. Many will remember the tall flourishing bush with garlands of great flowers growing in the grounds of the deserted house, described by Miss MITFORD in *Our Village*.

Subsequent accounts of long pruning occur from time to time. The most noteworthy in recent years is an article by G. H. NICHOLAS in *Les Amis des Roses*, 1925, describing the work of Mrs. H. FOOTE, which was attracting so much attention in America.

Before this date, however, the late DUKE OF BEDFORD and SPENCER PICKERING had been making extensive experiments at the Woburn Experimental Farm on the pruning of fruit trees. They were led to the inevitable conclusion that pruning inhibits growth and that the less a fruit tree is pruned the more prolific it will be and the larger its fruit. They found that the hard pruning of Apple trees yields a comparatively few large Apples. Moderate pruning gives many more, but smaller, Apples and very light pruning or thinning produces big crops of the largest sized fruit. I have obtained exactly similar results with Roses; no cases of failure of the method herein described have been recorded. A writer in the *Rose Annual* once related the

complete destruction by frost of a collection of long pruned Roses that had been growing happily for some eight or nine years. Enquiry disclosed that the big bushes had been pruned down to the ground, when it was discovered that they had been frosted. If large Rose bushes are pruned to the ground as much harm will be done to them as to other shrubs similarly treated. The only proper treatment of Rose bushes after frosting, if this should occur, is to wait until the bushes have started to grow strongly and then to cut out all wood that is not shooting. Actually long pruned Rose bushes suffer less from frost or cold winds than those that have been hard pruned.

2. THEORETICAL.

The method of long pruning is based on scientific knowledge of the processes of growth in plants. This knowledge may be said to commence with cognisance of the fact that the cells of plants are composed of "colloid" or jelly-like material. Like ordinary gelatin, such colloids absorb water with avidity. Such colloid structure is the mechanism by which the soil retains its moisture and the means by which a plant imbibes its water from the ground. Near their tips the roots of the plant are covered with thin-walled hairs making close contact with the mould—the apparatus whereby the moisture enters the plant. The whole mass of the plant acts together in absorbing moisture.

The water thus sucked up from the soil brings with it, in solution, mineral salts required by the plant in its growth. In passing upwards through the plant the sap, as we may call it, reaches the leaves, which make from the air (and not from the ground) the main bulk of material needed to build up the plant, the products consisting in the first place of sugars.

From the leaves, the descending sap diffuses downwards into the plant, transporting the products of growth to the storage organs, in the Rose the stems and roots, where the sugars are converted into starch. Roots, stems and leaves work together in harmony in this living process. Each has its proper function, none can be restricted without injury to the plant; the more we cut away the stems in pruning the more stored food products we remove, the fewer leaves are formed on the shorter stems, the smaller quantities of foodstuffs are manufactured by the fewer leaves and the less of this material is brought down to the roots through the sap.

A further and especially interesting function of the leaves, which they share with the tips of the growing shoots, has been discovered recently. This is the manufacture of tiny quantities of extremely powerful growth-promoting bodies, called "growth hormones." These substances seem to be necessary to excite the growth of the plant.

Now experiment shows that the removal of considerable quantities of good wood from the plant in the process of pruning delays by a month the deposition of carbohydrates in the stem. This is because we have taken away, with the stems, not only stored food-material, but supplies of growth hormones, which have come from the new swelling buds. The growth of the plant is brought to a halt until more of the hormone is made when the buds that remain start to shoot. Our conclusion is confirmed that no part of the plant can be taken away without disturbing the balance of all. This then is the theory of the obvious principle, that pruning *discourages* growth.

Why, then, do we prune our Roses? Let us examine a Rose

plant that has been allowed to grow naturally, without any pruning, into a fair sized bush. We shall see, as a rule, that it has one or two long new shoots which have come from the ground or form the base of the strong, older stems. These new canes may have grown good side shoots in the autumn. Other canes will have grown in previous years, their side shoots having branched again and again, each branch being smaller in turn. The oldest wood will be clothed in a mass of thin shoots. Finally, perhaps, we shall notice that some of the wood is quite dead.

If the bush should be blooming we should observe almost always that the largest and most beautiful flowers are borne on the stoutest and longest of stems. Thus we learn that the old stems produce progressively thinner and thinner side shoots, which bear smaller and smaller flowers, while the bush rejuvenates itself by producing new canes from the ground or near to the base of the plant. And had we been able to watch the bush from one year to another, we should have observed that the bigger the bush grew in size, the larger the new canes it produced and the bigger the flowers they bore.

Thus the reason for pruning is to keep the plant young and to make it throw strong new canes from the base that will bear flowers of the largest dimensions. Dead wood is cut out and old wood is removed because it will not bear good blooms. For a similar reason thin shoots may be taken away. But we must bear in mind always that each leaf and each stem play their part in the life of the plant. Vigorous plants may have more cut away, while very weak bushes will be hurt by removing any green shoot.

Finally, if we look at a Rose bush just starting to shoot, such as that in Fig. 78, we shall see that most new growths are coming from wood of the previous year, and that not one but a number of growths will be starting from each single stem.

The new shoots, as they grow, will contribute fresh products of growth to the old stem, from which they have sprung. Thus each old stem will swell and both it and its branches together will increase in substance, while the bush as a whole gets bigger each season.

But the new shoots on each stem depend for their sap on the amount which is held by that stem and the rate it can absorb sap from below. The extent of the growth of the side shoots depends on the size of the stem that supports them.

Now, suppose that we rub out each new growth, except one, from a branch. The new growth that is left can draw on the whole of the sap and stored food-stuffs in the branch which supports it. The new growth will be stronger and longer in consequence and will bear a larger and more beautiful Rose. To treat one stem in this way when the whole bush is growing strongly is not harmful. We must take great care, however, that such ephemeral gains are not won at too great future loss. The largest Roses are grown on the stoutest canes. First we must grow the canes. Too much restriction of side shoots will prevent the full growth of the bush and the largest flowers will never be obtained.

Thus we reach the unescapable conclusion that whether by pruning the stems, or by stopping the shoots, the less we restrict the growth of the plant the better blooms we shall eventually secure.

In face of these facts, what remains to be said in support of hard pruning? The beautiful flowers we see at the shows are grown by pruning the "trees" so hard that the new growths are restricted to

one or two only. So from a great many plants we obtain a few extra large blooms. But such rigorous treatment debilitates the plants so much that they become exhausted in two or three years. The method adopted more usually in gardens is a lighter sort of hard pruning, which gives more smaller blooms, and which some Roses tolerate better than others. Thus in practice some Roses are pruned very hard, others more moderately, while many will stand only so-called light pruning and some may hardly be pruned at all. These methods must be modified further to suit the class to which the Rose belongs, while each of the types of hard pruning has two subdivisions—for exhibition or for garden purposes. These various modifications yield altogether some forty-four types of hard pruning. This complication disappears when Roses are pruned by the natural method of long pruning, which is the same in principle for each and every type of Rose.

3. THE PRACTICE OF LONG PRUNING.

In long pruning two kinds of cut are made. The first is to sever a piece of old or dead wood from the plant, or to cut an unwanted shoot from the side of a stem. This cut is made as close to the good wood, or stem, as possible without cutting into it. It leaves the stem without any dead snag projecting. The second kind of cut is made to remove a smaller piece of dead or diseased wood from above a good eye, which has already started or will soon start into growth. This cut is not made exactly squarely across the stem. It is sloped very slightly away from the eye, so that any sap exuding from the cut before it heals will flow away from, and not over the eye. The cut is made close above the eye, but not nearer than about an eighth of an inch above it. If it is made too near the eye, or too sloping, the eye may be damaged or an unnecessary area of raw surface may be exposed to the attack of germs. If the cut is made further away from the eye an unsightly snag of dead wood will result.

The Roses we grow in our gardens to-day include a number of types. They comprise in the main Teas, Hybrid Teas and so-called Pernetianas among the large-flowered bushes, with dwarf growing cluster Roses, such as the Dwarf Polyanthas and Hybrid Polyanthas, as well as various types of climbing and rambling Roses.

RULE 1.—To prune newly planted Roses, whether bushes, standards, or climbers, and also the weakest growers among established plants.

Such Roses should not be pruned until the eyes, or leaf buds, have started to shoot. The actual time of year when this happens will depend on the treatment the Roses have experienced before planting as well as on the date when they were planted. Wait until, probably some time in April, the new-growths from the eyes are at least an inch and a half long. Then cut out completely any dead branches and cut off any dead ends of the stems above strong new growths and any wood having eyes that have not started to grow freely. Nothing else should be done. All newly planted Roses are surgical cases, as a well-known grower used to say. They need all the leaves they can produce to manufacture in the sunshine the maximum quantities of food material and energising substances. At about the end of April, or later with newly planted Roses, when the Rose buds will be beginning to appear, it is helpful to the plants to remove the buds growing on thin stems. These will not make large flowers and there will be sufficient good buds without them.

RULE 2.—To prune established large-flowered bush Roses of all kinds, except the weakest growers.

The exact date for pruning is not important. The plants will be allowed to brave the weather just as the climbing and rambling varieties have to do. The work may be carried out at any time between the last week of March and the end of April. It is better to finish it by the middle of April in order to avoid bleeding of sap where old wood is cut into. If this should occur, the cut will look wet the next day after pruning and should be covered with a lump of clean wet clay. The large-flowered Roses may be pruned first, leaving the cluster Roses to be dealt with last.

The pruning comprises complete removal of dead and diseased wood, the cutting out of wood that is shown to be exhausted by having produced no good shoots during the previous season and the reduction of branched stems to single shoots.

The photographs reproduced in Figs. 78 to 81 illustrate the pruning of vigorous Roses and moderate growers. If we consider the bush depicted in Fig. 78 we notice (by comparison with the two-foot rule) that it has grown to about 4 feet in height. This is what we may call a vigorous variety. It comprises two main stems of which the one on the right is probably three years old, the other being a year younger. There was no new wood from the base during the previous season, but plenty of strong branches have grown out higher up, some of them nearly half an inch thick. Consider the branch on the right, near the rule. That branch has produced no good thick side shoots. It is cut off, where it joins the main stem, as in Fig. 79. Returning to Fig. 78, follow this stem upwards in the direction of the rule; just above the top of the rule two side branches have grown outwards during the previous year, nearly at the same place, while the older main stem, above, has grown a lot of not very strong wood. This is a typical kind of growth, except that the two side shoots often start from eyes further apart. The old stem is cut out above the uppermost of the new side shoots, as seen in Fig. 79.

Now look at the two side shoots we have left in Fig. 78. These have branched later in the same season. On such a vigorous plant we can spare the weaker shoots and, since they will not produce large Roses, we cut them right out, where they join the main shoot. The result is shown in Fig. 79. We have left three strong branches of the previous year's growth. The pruning of this portion of the right-hand stem is finished by cutting off the tips of the branches above a strong new growth of the current year, or, in case of a late variety, above a good eye. The leaves are left just as they are. They are beginning to produce already growth promoting substances essential to the plant. We do not trouble about the direction of the new growths, because the branches are so far apart. But if we see any new growths, either now or later, that are likely to grow too close to one another we can rub out one of the growths where it has started from the branch.

Now look at the lower part of this same right-hand stem in Fig. 78. Near the base on the left is an older shoot that has produced no good new side shoots. This is cut right out. Similarly, another older branch which is to be seen just above a good new side shoot. Here and there several very thin shoots from the older wood may be seen. These also are cut off. Any coming from the base may be treated in the same way, like the small shoot on the left-hand stem at the base. The right-hand half of the bush has now been pruned.

The main stem on the left of Fig. 78 is only two years old. There is a nice new branch near the base from which two strong new growths have just started. These are left just as they are. At the same point on the main stem a stronger new branch has grown facing directly towards us. This has several good new growths close together just beginning at the top. These are reduced to two. Otherwise the flowers would be smaller. If we want the largest possible flowers, we could cut off the new growth on the left, leaving only one new growth. But this would tend to reduce the vigour of the plant and affect subsequent flowers. Looking again at Fig. 78 there is another very strong branch on the right just above the one last considered. Evidently this was produced earlier in the season, because there are quite a number of side branches at the top; the strongest of these is retained and the remainder cut right out. Only one new growth has been left on this branch. Another strong new cane has grown outwards to the left from a point just above. This has branched twice during the season. At each fork the older part of the shoot is cut right off, leaving a long branch which is new throughout its length. It will be observed that this is starting into growth in several places. The bush will be all the more vigorous if these new growths are allowed to remain. This particular bush is now completely pruned.

Occasionally in pruning some of the less hardy varieties it may be noticed, when cutting off the dead tip of a branch, that the pith of the branch below the cut is brown or discoloured. This means that that portion also of the branch has been damaged in the cold weather. The stem must be cut away above a lower outward pointing eye, where the pith is not much discoloured. This damage happens more frequently with hard pruned Roses because they start to grow new wood much later in the year, so that the wood has less time to ripen before the winter and because the supplies of invigorating growth hormone have been taken away. Actually the variety in the photograph is not regarded as particularly hardy, but it will be seen that there is no dead wood or any dead tips of the shoots. When much wood is seen to be hurt by the frost, the pruning is left until the bush is growing freely and then pruned above strong new shoots. This treatment applies to all frosted Roses. The new blooms will not be hurt in the least.

We come now to the pruning of the variety shown in Figs. 80 and 81. This is only a moderate grower of about 2 feet in height. It must be pruned very little. The less it is pruned the more it will grow. There is an older branch on the right of the middle, which is cut right out. The stem from which this side shoot was cut has a good side branch higher up. This is reduced to a single stem by cutting off the older portion at each fork. The stem above is much branched and is cut right out.

The two outer canes were grown in the previous season. The tip of that on the right is cut off together with a new growth that is obviously not so strong as the two below. On the left we see a typical branching stem, from which the middle older wood is cut out. A tiny snag of eyeless wood is cut off above the topmost new growth. This Rose is now completely pruned.

Very vigorous bushes, which attain to a height of 6 or 8 feet, are pruned in the same manner as the vigorous varieties shown in Figs. 78 and 79, but it is not possible to illustrate the detail in a small picture.

RULE 3.—Pruning bush cluster Roses (e.g. Dwarf Polyanthas and Hybrid Polyanthas), single Roses, Briars and Rose species.

The time of pruning is the same as for large-flowered bush Roses. Although the Roses in this section belong to a number of different types they have this property in common: that they are used for decorative purposes only. Thus quality of bloom is not material and the pruning of such Roses is the simplest of all. It comprises merely the cutting out of old, dead, diseased and exhausted wood and the removal of old flower stems. The branches of these Roses are somewhat thinner generally than those of large-flowered kinds. There is no object in removing thin shoots. In case a bush may appear to be overcrowded, it may be thinned a little by cutting out a branch that interferes with another. Usually this will not be necessary. Many of the Dwarf Polyantha and Hybrid Polyantha Roses, typified by such varieties as 'Coral Cluster,' 'Salmon Spray' and 'Else Poulsen,' may grow into large bushes in course of time. These and some of the single Roses, such as 'Red Letter Day' and 'Dainty Bess,' produce glorious banks of colour when massed in borders. In case bedding out effects are desired for small beds in formal gardens, the pruning of Dwarf and Hybrid Polyantha Roses can be as severe as desired.

RULE 4.—Pruning standard Roses.

These are pruned like the corresponding bush Roses as directed in rule 2 with the difference that special attention must be given to the symmetry of the head. Unless there is a strong outward growing new shoot at the end of a stem its tip must be cut off above an outward pointing eye, whether that eye has started into growth or not. Extra strong shoots may need to be shortened considerably, always to an outward growing eye, in order to preserve the general shape of the tree. This will have the effect of reducing the vigour of the plant to some extent. And, since a standard Rose tree must be prevented from rejuvenating itself in Nature's way by throwing up new strong shoots from the ground, standard Roses are not long lived as a rule. They have this advantage, however, that the extra vigour of the strong stem with its large stores of carbohydrate food material contribute to the production of rather larger flowers in the first few years than the corresponding bush varieties in their earlier stages.

RULE 5.—The pruning of climbing and rambling Roses, excepting the climbing sports of large-flowered bush Roses.

Climbing Roses include a great variety of types. But, although individual habits differ considerably, the principles and practice of pruning them all are the same. The pruning of such Roses should be commenced in November so that the task may be completed, as weather permits, before it is time to commence work on the bush Roses. Roses should not be pruned while the stems are frozen, as then they are liable to break.

All Roses in this group have the characteristic of producing long flowerless stems and branches that throw out in the following season short side branches on which the flowers are borne. After flowering, the stems and long branches will grow a further number of long shoots which, in their turn, will grow short flowering side shoots next year.

In pruning, shoots of the long flowerless type are retained, while short shoots that have flowered already are cut right back to the stem, unless the number of new long shoots is insufficient to maintain the vigour of the plant when the short shoots are cut back to two or three eyes. In addition, dead wood is cut right out and exhausted wood

that has not grown any long new shoots is cut away from the base or above a long new shoot. But care must be taken in removing apparently exhausted wood because some types, particularly *Wichurianas*, such as 'Gustave Juranville,' have a habit of growing long new shoots at the end of a seemingly dead stem which may have even several small dead branches below to increase the deception. Only after cutting out this apparently useless stem do we discover that we have taken away, at the end, a beautiful long new shoot.

Standard Roses of this group are pruned in the same manner.

RULE 6.—The pruning of climbing sports of large-flowered bush Roses and Roses of similar habit.

This class includes such Roses as 'Climbing Caroline Testout,' 'Climbing Mme. Butterfly,' 'Climbing Paul Lede' and that old favourite 'Gloire de Dijon.' The only differences in behaviour of these Roses, as compared with other climbers, are that they do not produce so many long flowerless stems and side shoots and that the flowering side shoots are thicker than those on other climbers and flower again and again in the same or subsequent years, like the side shoots of the corresponding bush Roses.

These Roses are pruned during the winter. They need only to have dead and exhausted wood removed and thin side shoots cut back to the main stems. They do best grown on a wall or screen so that the long stems and growths can be trained more or less in a horizontal direction, in which position they flower more freely.

RULE 7.—Rejuvenating neglected and maltreated Roses.

Bushes that have been allowed to grow wild for some time may be in a flourishing condition from lack of pruning, but usually they will contain a quantity of dead and exhausted wood which is more or less harmful to the plants and must be cut out completely. Probably there will be also some ugly strong new shoots growing from old wood which are spoiling the appearance of the plant. Some of this ugly growth may be cut away, but there is danger in removing too much as this will give the plant a set-back from which it will not recover. The remainder of the ugly growths can be removed in the following years. All suckers must of course be removed.

Other plants may have been maltreated by the cutting away year by year of the strong new canes from the ground intended by Nature to strengthen and rejuvenate the bush. The only way to restore such plants to health is to cut out completely any wood that is quite dead and not to prune the remainder at all. In a year or two, with this treatment, the bush should have thrown up a sufficient number of strong new growths to allow of all the old wood being cut right away, when the plant will be completely rejuvenated.

4. THE RESULTS OF LONG PRUNING.

This method of pruning is so simple and straightforward that a novice can undertake it without misgiving. Long pruning transforms the bushes from stunted shrubs with few flowers of medium size into magnificent strong healthy bushes from 3 to 6 or even 8 feet in height. Under this system the flowers come earlier than with hard pruning; the first flowers to open, towards the end of May, are likely to be damaged slightly by the hard weather through which they have grown, like the earliest blooms borne on large-flowered climbers. Sometimes the early new shoots or the buds they bear are cut back by

cold winds. When this happens the old stem must not be cut off at once. It is essential to wait until strong new growths have appeared and then to remove any dead wood or portions of new shoot above them, exactly as we do with climbers. Perfect flowers are produced by about June 4.

The form, size and colour of individual blooms produced by this method are usually better than those of Roses grown by hard pruning. There is an added elegance of the larger blooms as well as a depth of colour not usually seen on flowers grown out of doors. The blossoms are carried on long, stiff, straight stems which hold their heads up bravely on varieties that have weak flower stalks when hard pruned. New canes from the base begin to come early in May or June if the beds are well watered. The new canes ripen well in the hot summer sun and thus are able to withstand the cold winter weather. If the watering is kept going, a second crop of new wood begins to grow when the first has flowered and this new wood has time to ripen well before the winter comes. The bushes grow vigorously, increasing in size from year to year and throwing up stronger and stronger canes in each succeeding summer. In the first year there is a marked increase in vigour of the plant and some good blooms are produced. In the third year we begin to realize something of the splendour which the particular variety of Rose can exhibit. The bushes flower from May until Christmas, look happy all the time and seem never to grow old.

No die-back or failure occurs during winter, or after pruning time in spring. I attribute the vigour and general good health to the abundance of growth hormones produced, as shown by the difference in behaviour of plants watered with a solution of Hortomone A, a preparation of one of these growth-making compounds. Three fluid ounces of the solution supplied are made up to four gallons with water. The mixture is applied at the rate of one pint to a quart to the ground round the roots of each bush according to its size. The beds should not be too moist at the time and they should not be watered next day. The best time for the dose is during warm weather in April. If expense be no object, the application may be given again at intervals of six weeks or so. Rose bushes watered with the solution grow even better than those not so treated, the buds are noticeably bigger in size and the flowers larger, more deeply coloured, and less hurt by cold winds.

The practice of summer pruning must be rigorously avoided. Nothing can be more harmful than to cut off stems and leaves in full activity of growth. The long new canes of climbing Roses ripen better if the older growths are left. It is easy to tie in the new growths so that they get full benefit from sunlight.

The remarkable effect in promoting strong growth of Hortomone A has already been mentioned. Perhaps even a more useful effect is in removing the setback due to transplantation. It takes some time for a bush received from the nursery to become fully established in the garden. It is usual to soak the bushes in water for twenty-four hours when received from the nursery and to plant them after that. But it is better after soaking in water to steep the roots, for one night only, in solution of Hortomone A, half as strong as that used for watering the beds. If the soil is still warm, say any time before Christmas or in April, the hormone makes the roots start to grow immediately. The bushes become thoroughly established in a few weeks and next summer they behave almost as if they had never been moved. The preparation has no effect if the Roses are planted in cold soil between

January and March. The best time for planting is undoubtedly the middle of October when the warmth of the soil makes the roots grow at once. Roses planted with their leaves at this time, even without Hortomone A, do better than those planted in November.

It will interest those who bud their own Roses to know that steeping over night the stems, with the buds to be budded, in solution of Hortomone A of the same strength as for the roots of Rose bushes will ensure almost a hundred per cent. take. The cuts in the stocks heal over very neatly and in about half the time that is needed for untreated buds. The stems after steeping are rinsed in water, dried with a cloth and the buds sliced off and inserted, without removing the thin piece of wood behind the bud.

NEW TULIPS AT WISLEY.

SOME very interesting Tulip species have been flowering at Wisley this year from material sent to the Society by correspondents.

In the first place were some bulbs received in 1939 from Miss ESMÉ WILLIAMS from Kabul. They flowered last season but were to be seen more fully this year. They all belonged to the *Clusiana* group, a well-defined section of the genus, which inhabits the mountain country of Persia, Iraq, Afghanistan and Upper India as far east as Kashmir. *T. Clusiana* itself has long been known and is unique among Tulips in being a pentaploid with five sets of chromosomes, but an almost indistinguishable form, *T. chitralensis*, from Upper India, proved to be tetraploid with four sets of chromosomes, and this is closely linked with another tetraploid species, *T. stellata*, which has a yellow ground variant—*T. stellata chrysantha*. Within the last few years the diploid form, which must be presumed as the origin of the whole group, turned up in some material sent from Kashmir. This diploid, which has been named *T. Aitchisonii*, shows both white ground and yellow ground forms, and is one of the smallest of Tulips, often not more than 3 inches in height. All the members of the group have certain features in common: the round bulbs carry a little tuft of wool at the apex; the backs of the outer segments, whether white or yellow, possess a tapering splash of crimson, and in *T. Clusiana* and *T. chitralensis* there is a deep purple blotch at the base of the flower inside, with filaments, anthers and pollen of the same deep purple colour. In the other species no blotch shows, though intermediate forms exist with a faint purple or brown stain instead of the full colour.

The new material from Kabul contains two groups. In one the flowers were of the *Clusiana* type but larger in every respect and with a very large and intensely coloured blotch. In one specimen, however, the crimson splash on the backs of the outer segments extended all over the petals, inside and out, resulting in a flower unique in my experience. It will be possible to determine the chromosomes until next winter, but an examination of the pollen shows that the plants are neither pentaploids nor triploids but must possess an even number of sets of chromosomes. Possibly they are octoploids due to a doubling up of a tetraploid nucleus, as the original tetraploid came by the doubling of a diploid nucleus.

The second group was very distinct, a little smaller, neat and upright in growth, with an intense yellow ground colour, but carrying deep purple blotch, filaments, anthers and pollen like *Clusiana* itself. Some

hybrids made at Merton by crossing *chitralensis* with *stellata chrysantha* were rather pale counterparts of these new forms, but were far from being so distinctive.

If these new forms can be multiplied freely they will prove very desirable additions to the Tulip species for the garden.

The other novelty to be seen at Wisley was *T. ferghanica*, two plants of which were blooming for the first time from seed sent from the University of Tashkent. They proved to be small yellow flowered Tulips very similar to *T. Kolpakowskiana* and if their specific identity can be established will constitute another addition to a group of Central Asiatic Tulips from Eastern Turkistan, Tian Shan and the Pamir-Alai mountains, which include *T. altaica*, *T. Kolpakowskiana*, *T. iliensis*, *T. Kesselringii*, all very much alike and by no means clearly distinguished by comparatively minor differences.

A. D. H.

PRUNING APPLES.

By J. M. S. POTTER, N.D.H.

As a result of the article on "The Pruning of Hardy Fruit Trees," published in the November issue of the JOURNAL (1941), a number of interesting letters have been received from readers. No one of the correspondents has questioned the principles suggested for the pruning of Apples, but many ask about the value of other methods of pruning as compared to the orthodox spur pruning described in the article. The result of studying several books or listening to talks on the wireless has left some amateurs more confused than before. There is no *best* method; the procedure must be adapted to the type of tree and the environment. In this article the needs of the amateur with a small garden alone will be considered.

The methods on which the correspondents want information are (1) The leave alone type of pruning; (2) the Lorette system; and (3) the orthodox method of spur pruning.

I. LEAVE ALONE PRUNING.

Since the amateur usually grows trees of a restricted habit such as cordons, espalier and dwarf bush trees, some form of systematic pruning is required in order to keep the trees in shape and within bounds. For these types of trees the "Leave Alone Method of Pruning" can be immediately dismissed, and that applies even to half-standard and standard forms of orchard trees.

1. Apple trees left to grow at their own free will eventually become one mass of tangled branches into which the sun cannot penetrate, nor can there be a free circulation of air amongst the branches.

2. These conditions are ideal for the breeding of insect pests and fungus diseases.

3. It is impossible to spray this type of tree with a small spraying machine. Even with a power sprayer it would be extremely difficult to wet all the foliage when spraying against Apple Scab.

4. The quality and keeping quality of the fruit is impaired due to much of the fruit being deprived of sunlight.

5. Unpruned trees tend to produce a very heavy crop one year and no fruit the next, that is they tend to crop biennially.

6. In the end the tree falls into such a condition as to require drastic treatment in order to obtain some new fruitful wood.

The annual pruning of the tall standard and the somewhat shorter stemmed half-standards should consist in removing any crossing or over-crowding secondary branches. A light thinning of the laterals is also necessary, particularly where they may be congested; the long ones can be cut out or shortened back as need be, but the shorter ones are left untouched. The thinning not only maintains the tree in shapely form, but it also stimulates a certain amount of new growth each year, which is the best preventive of the habit of biennial bearing.

2. LORETTE PRUNING.

The term Lorette pruning is applied to a system devised by a famous French horticulturist, M. LORETTE. The dominant note of this system is the exclusion of winter pruning; the production of fruit buds is secured by summer pruning, coupled with a late spring pruning. M. LORETTE applied it to trained trees of a very restricted habit, such as cordon, espalier and other forms like the goblet winged pyramid, etc., which are more grown on the continent than in this country. It was practised chiefly on Pears and to a lesser extent on Apples. M. LORETTE found that his method of summer pruning not only produced the fruit spurs close to the main stem and in a more uniform manner than by the ordinary spur pruning done in winter, but that the trees so treated gave the maximum yield.

In order to understand Lorette pruning it is necessary to have some knowledge of the morphological characters of Pear or Apple shoots. An Apple shoot in the summer carries a bud in the axil of each leaf, called an axillary bud, and when carrying out ordinary spur pruning in the winter the shoot is cut back to an axillary bud. At the base of the growing shoot just above where it joins the main stem will be found two leaflets smaller in size than the ordinary leaves. These are called stipulary leaves, and in the axils of these leaves are the stipulary buds. Below these stipulary leaves where the shoot actually joins the branch, wrinkles in the bark will be seen and in these wrinkles are inconspicuous eyes known as latent eyes. Under normal circumstances the stipulary and latent buds remain dormant. LORETTE aims at directing the sap of the lateral shoots towards the stipulary eyes, and to a lesser extent to the latent eyes, by pruning the laterals to just above the stipulary leaves in June, in July and again in August. He considers that shoots arising from the stipulary and latent eyes are less vigorous than shoots arising from axillary eyes, and in some will develop directly into fruit buds.

The following is a very brief outline of the pruning routine practised by M. LORETTE:

1. The first pruning of the year is done towards the end of April, and is only applied to the leading shoots made the previous year and which have increased the length of each main branch. If the extending shoot is normally well developed, it is cut back by about one-third. If not well ripened it is shortened by one-half. M. LORETTE claims that by leaving the pruning of the leading shoots until the tree is in growth, the buds on these shoots are stimulated into growth to a greater degree than if pruning is done in the winter. Thus the leading shoots were well provided with laterals instead of possessing some bare areas.

2. About the middle of June the laterals are pruned back to the

two small stipulary leaflets at the base. The base of the laterals at this pruning should be woody, a condition which is usually reached when they have grown to 10 or 12 inches long. If the laterals are still soft at this period they should be left until July. (If some of the laterals are growing strongly the growing points should be pinched out in May in order to obtain all the laterals as near as possible to a uniform state of development when the first pruning is carried out in June.)

3. Any laterals not fully developed in June are pruned back in July when they have reached the length of 10 to 12 inches. So also are any shoots which have developed from the stipulary eyes of the shoots pruned in June, the base of which has become woody.

4. In August and again in early September the secondary shoots arising from the previous prunings are cut back to just above the stipulary leaves when they have become long enough.

The foregoing is a very brief outline of the Lorette system ; it is a complicated one, and amateurs who wish for further details should consult *The Lorette System of Pruning*, by LOUIS LORETTE, translated by W. R. DYKES.

The main objection to the Lorette method of pruning in this country is that our weather rarely provides the long growing season required for the successive prunings. A modified system of summer pruning, which should not be called the Lorette method, is described in the Report of the R.H.S. Fruit Conference, 1934—"Summer Pruning of Hardy Fruits," by the late Mr. A. M. LEES.

3. SPUR PRUNING.

More controversy exists over spur pruning of Apples than over any other operation. The whole secret of the success of spur pruning lies in the grower adapting it to his own particular conditions. So the following notes are not concerned with some particular way of spur pruning, but with the flexibility of the principles underlying its application, bearing in mind that the notes will be concerned with trees of a restricted shape.

No hard and fast rule can be laid down as to the degree of spur pruning to be done, as this must be modified to suit the general vigour of the tree to be pruned, which depends upon its general environmental conditions, such as soil, climatic conditions of the particular district, on age, on manuring and on root stock. In order to emphasise this point, here is a simple illustration. 'Cox's Orange' Apples are grown as cordons against a wall and the amount of growth made is probably a little less than normal owing to the dryness of the position. Close at hand 'Cox's Orange' are grown as bush trees in the open close to ground cultivated and manured for vegetables, so that they make a little more than normal growth. In the case of the cordons the laterals should be cut back to two or three buds and the extending shoots shortened by half of their length. Hard pruning stimulates more growth, and this is necessary with these cordons in order to maintain a satisfactory state of fruitful vigour. On the other hand, the bush trees require but light pruning in order to reduce vigour. Completely remove any crossing or overcrowding laterals, then shorten the longest of the others by half their length, leaving unpruned those which do not exceed 9 or 10 inches in length. The leaders should only have an inch or two of the end removed. This, of course, entails long spurs, but once the tree has settled down into regular bearing the long spurs

can be gradually shortened back in order to get them closer to the main branches. The general guide is therefore to prune hard if the tree is lacking in vigour and prune light if making too much growth.

When the Apple tree is systematically pruned year after year the spurs increase in size and eventually the branches become a mass of gnarled spurs. When this stage is reached drastic spur thinning has to be carried out in order to relieve the tree of some of its far too numerous fruit buds. The skilled pruner will never allow this stage to develop, because when the cordon tree has become seven or eight years old or the bush eleven or twelve, he will start regulating the spurs. At the base of the branches the long spurs are shortened back to a fruit bud, or thinned out if too crowded, and the weak ones, which by their position do not obtain much sun, can be completely cut out. A little of this is done each year, gradually working up the branches as the spurs increase in size, so that the spurs never become overcrowded and the resources of the tree are not taxed by firstly producing too many fruit buds and later numerous small undersized fruits. If this over-taxing is permitted the tree is liable to produce a heavy crop one year and nothing the next.

In order to understand more fully the foregoing notes on spur pruning it is necessary to consider the bearing habit of Apples. The bulk of the crop is borne on two year old or older wood, and the addition of fruiting wood to the main branches is mainly dependent upon the tree growing satisfactorily so that some new growth is obtained every year. This new growth will in its second year produce fruit buds which in turn will develop into flowers and then fruit the following season. Thus, if the laterals on a cordon are left unpruned in the winter, fruit buds will develop on these laterals during the following summer, and in the summer of the following year produce flowers and later fruit. Thus the laterals made during 1941 produce fruit buds in 1942 which give rise to fruit in 1943. Pruning is necessary since otherwise the laterals of the unpruned cordons would soon be intermingling with one another, causing overcrowding, a condition which is ideal for insect pests and fungus diseases. Most of the fruit buds would be situated towards the ends of the laterals and might easily break them down. Still more important is that the over-production of fruit buds due to no pruning on a tree of normal vigour seriously reduces new growth, sometimes to nothing at all. No fruiting wood is now being added to the framework or branches, and the tree tends to bear a heavy crop one year and little or no fruit the next. Spur pruning is therefore applied to maintain a satisfactory state of fruitful vigour.

The production of fruit buds is not *entirely* dependent on the two year old laterals. Let us consider the building of a spur. A lateral developed directly from a main branch and of moderate vigour, is cut back to five or six buds in the winter, thus forming a simple spur. This pruning (1) encourages vigour, (2) ensures that all the buds will develop, some into fruit buds, (3) makes a spur close to the main branch without waste wood. The following summer the top buds of the spur (*i.e.* the top bud and possibly the bud immediately below it) will develop into laterals, and the basal buds into fruit buds. During the subsequent winter the lateral or laterals are again spurred back, and the simple spur becomes a compound spur. In this way a certain amount of fruitful wood is added to the spur each year, but this annual spurring entails an increase in the size of the spur, which in time requires reducing.

Turning to the fruit bud, this produces fruit the year after it is formed. The part below the point of attachment of the fruit stalk swells slightly, and this swelling usually possesses two buds, which develop in the following summer. If the tree is vigorous, one bud will grow out into a lateral and the other produce a fruit bud, or both will give rise to fruit buds. As the tree becomes older it is not unusual for one to develop into a fruit bud, while the other remains dormant. So here is a second course of fruit bud production, in those fruit buds arising from the point of attachment of the old fruit stalk. In Pears the swelling is much more pronounced than in Apples. On the young tree the potential fruiting wood is largely dependent upon the two year old laterals, but as the tree becomes older the source of fruit buds from the swellings increases. For every fruit picked two fruit buds will often develop, more than replacing the original fruiting bud. The fully developed tree of restricted habit produces many more fruit buds from the swellings than from the two year old laterals. This habit of producing fruit buds from the point of union of the fruit stalk has to some extent an influence on the regularity of the cropping of some varieties. Supposing that in any year the tree carries a heavy crop, most of the fruit is produced from the fruit buds arising from the swellings, but in the following year this source is much reduced because the buds at the point of union of the former fruit stalks are developing into fruit buds to produce fruit the next year. To put it more simply the fruit is produced in 1942 and in 1943 the swellings give rise to one or two fruit buds which bear fruit in 1944. In order to correct this tendency towards biennial bearing with varieties prone to the habit, prune the laterals lightly in the winter prior to the tree bearing a heavy crop. The resulting long laterals will make fruit buds during the summer, when the tree is bearing well, and the following year these laterals will bear fruit, though there may be a marked absence of fruit arising from the swellings. In this way the tendency to biennial bearing can be partly corrected. Pruning should, however, be hard in the winter before a light crop in order to encourage growth which will provide fruiting wood two years hence. So prune lightly when the buds indicate a heavy crop is to be expected, but prune severely when the biennial habit or the buds promise only a light crop. Some varieties of course produce some fruit buds on the swellings each year and are more or less regular croppers, when this type of treatment is hardly necessary.

Some enquiries were received as to the division of Apple varieties into groups for pruning. The differences are real and were set out in order to simplify the procedure for beginners, but none the less the degree of spurring must be modified to suit the vigour of the tree in its particular environment.

APRICOTS.

By the REV. M. C. POTTER, Sc.D.

MAY I add a short note to Lady MARTINEAU's account of Apricots, giving experiences of this fruit.

(1) An Apricot on a south wall at Bulkington, Warwickshire, produced a fair crop for a few years and then after a good crop died when about fifteen years old. The roots would be under a gravel drive.

(2) A standard Apricot at Brookside, Cambridge, where the gardens are on the east side of the terrace with western aspect, behaved in a similar manner. After an exceptionally good crop the tree died, again when about fifteen years of age.

(3) An Apricot on a south wall of New Milton, Hants., behaved in a similar manner. This tree produced very fine fruit for some years and after a large amount of fruit, gummosis set in and the tree died at the same age as the two previous examples. A short stick of potash was inserted in a hole bored into the trunk near the ground but this did not prevent the further spread of gummosis.

The cause of the relatively short life of these trees appears to be unknown; such explanations as the roots reaching unfavourable soil seem quite inadequate. Although these trees are, generally speaking, short-lived it is quite worth while to grow them on a south wall, and Apricots would add to the camouflage of a house as well as providing delicious fruit.

BOOK REVIEWS.

"Alpines in Colour and Cultivation." By T. C. Mansfield. 8vo. 272 pp. Ill. (William Collins, London, 1942.) 17s. 6d.

Farrer's *The English Rock Garden*, brought up to date by Dr. Clay in 1937, has long been the standard work for growers of alpine plants. But since it first appeared in 1918 many more plants have been introduced and more information obtained about those already in cultivation. A new book on the subject to meet the needs of the present generation of rock gardeners has been needed and is now supplied. The present work gives in a complete and intelligible form the details of cultivation for plants out of doors or in an alpine house; propagation is also dealt with in a very adequate manner, and the treatment of insect pests. The main part of the book consists of a "Glossary of Plants," and when one has taken exception to the curious use of the word Glossary (which the dictionary defines as "a list with explanations of abstruse, antiquated, dialectal or technical terms") one can whole-heartedly commend the list given. The plants are treated alphabetically in genera; each genus has a brief note on its main characteristics, followed by a list of desirable species with a short description and details of the size, type of plant, time of flowering, soil required, and in many cases of the colour of the flower as matched against the Royal Horticultural Society's Colour Chart.

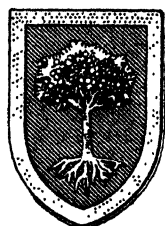
An important feature of the book is the coloured plates, of which there are eighty; a serious attempt has been made to reproduce the subjects depicted in their true colours, and with a very considerable measure of success. The colour photographs were all taken by artificial light under studio conditions for uniformity, and a number of species has been included in each plate; as is inevitable, some combinations are happier than others, but if anyone feels that the one selected to decorate the wrapper is too garish to encourage further investigation, he is recommended to compare the flowers of *Saponaria ocymoides* var. *rubra compacta* with the appropriate plate of the Colour Chart and he will find it a very close match indeed. Plates 13 and 14, which include the Campanulas, are very good reproductions of a colour that is always difficult to reproduce satisfactorily. If the choice of plants to associate together does not always satisfy the artistic sense, the colour of the individual species is in the majority of cases very successfully attained.

"Garden Herbs." By G. E. Whitehead. Sm. 8vo. 84 pp. (Adam & Charles Black, London, 1942.) 3s.

This little book gives valuable advice on the cultivation and harvesting of culinary herbs, methods of distillation and a calendar of operations being included. It is simply written and should prove useful to anyone who wishes to supplement from his own garden the flavourings now becoming somewhat difficult to purchase.

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Part 8

August 1942

THE SECRETARY'S PAGE.

Monthly Show.—There will be no Show in August, and the next one will be held on September 15 (12 noon to 6 P.M.) and 16 (10 A.M. to 5 P.M.). At this show the National Dahlia and National Chrysanthemum Societies will co-operate.

Fruit and Vegetable Show.—The Fruit and Vegetable Show will be held on Tuesday, October 6 (12 noon to 6 P.M.) and Wednesday, October 7 (10 A.M. to 4 P.M.). Schedules are now obtainable on application to The Secretary, R.H.S. Offices, Vincent Square, London, S.W. 1.

Demonstrations at Wisley.—On August 19 and 20 from 2 to 4 P.M. there will be a demonstration in the Flower Garden of Vegetative Propagation of Plants, and on September 16 and 17 from 2 to 4 P.M. there will be a demonstration of Harvesting and Storing in the Vegetable Garden. Would Fellows and their friends who intend to be present kindly inform the Director of the Gardens so that arrangements may be made.

Red Cross Auction Sale.—The President, LORD ABERCONWAY, had the pleasure of handing over to the DUKE OF NORFOLK on the occasion of the Monthly Show on June 16 a cheque for £3,750, being the result of the Auction Sale held by the Society. It is hoped that this sum will eventually be increased to £4,000. The President took the opportunity of thanking all donors of gifts for their generosity, all purchasers for their charity, members of the Committee for their advice, and the staff of the Society for its work—all of which went to make the Auction a success.

Journals.—To economize paper as much as possible, the number of the JOURNALS printed has been cut down to a minimum since the commencement of the War. The Secretary would be pleased to receive from Fellows who do not file their JOURNALS copies for September, October, November and December, 1939, April, June, July and November 1940, and January, August and December 1941. An appeal for unwanted copies of the JOURNAL for 1942 will be issued later in the year.

Examination Results :—

Teachers' Advanced Examination in School and Cottage Gardening, held on June 4 and 5, 1942. Twenty-five candidates entered for this Examination and of these 16 passed ; 6 failed ; and 3 were absent.

National Diploma in Horticulture, Preliminary Examination, held on June 8, 9, 10, 11 and 12, 1942. Seventy-two candidates entered for this Examination, and of these 42 passed ; 20 failed ; and 10 were absent.

National Diploma in Horticulture, Final, Section 1 (General Horticulture), held on June 16, 17, 18 and 19, 1942. Thirty-two candidates entered for this Examination, and of these 10 passed ; 20 failed ; and 2 were absent.

The following have been awarded the National Diploma in Horticulture :

Section I—General Horticulture

Day, Harry	Paine, Emma Victoria
Fraser, John Chalmers	Rees, Gwenneth
Freeman, Guy William George	Selby, Frederick George
Lancaster, Margaret Hammond	Simpson, Charles Alexander
Nunn, Stanley George Ablitt	Woodward, Arthur.

Section III—Market Gardening

Thomas, Cyril Timothy	Wadsworth, Robert Cowling.
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Section VI—Gardening in Public Parks.

Frank Herbert Eul	Kenneth McCreadie
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Bottling Tomato Juice.—The following is the method of bottling Tomato juice recommended by the Long Ashton Research Station which it is thought may be of interest to Fellows :—

"The type of product which is generally recommended is not the clear juice, but a sieved puree, as this contains more flavour and is of more value from the point of view of the vitamin content. The method of preparing it is as follows :

"Cook the Tomatos with just sufficient water to prevent them from burning, in a closed saucepan until they are soft. Rub the pulp through a hair sieve and as quickly as possible pour the pulp into small preserving bottles or other jars which can be made air-tight. Sterilize the juice by placing the bottles on a rack in a pan of cold water and raising the temperature of the water to 190° F. in 1½ hours and keeping it at that temperature for half an hour. 190° F. is just above simmering point. When the jars are taken from the sterilizer any with screw bands should have the lids tightened on securely. Should bottles with corks be used, the corks would need boiling for one-quarter hour immediately before use and should be wired on to keep them in place while the bottles are being sterilized."

Strawberry 'Corvallis.'—In 1934 several varieties of Strawberries were received for trial from Mr. G. Waldo, Corvallis, Oregon, U.S.A. Since that date the varieties have been undergoing trial in the National Commercial Fruit Trials at Wisley, and one of them has consistently cropped heavily while maintaining a satisfactory state of vigour (see Fig. 83). This is the variety 'Corvallis' Strawberry, which the Joint

Fruit Testing Committee considered would be a good acquisition to our popular English varieties. Permission for the distribution of surplus stock of this variety has been obtained from the introducer, and applications are invited from Fellows, which will be subject to the following stipulations:—

1. The number of plants available is very limited.
2. All applications will be balloted and only those received before September 1, 1942, will be considered.
3. The successful applicants will receive plants only on the understanding that these are planted for propagation and further distribution. (It is felt that Fellows will be willing to participate in this work, so that the variety can become more widely distributed, as the only existing stock in this country is at present at Wisley.)
4. Applications should be sent to the Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey.

Editorship.—Fellows and Associates will have heard with deep regret of the death of Sir A. Daniel Hall, Editor of the JOURNAL and of the Society's publications. Mrs. Vera Higgins, who has been acting as Assistant Editor, has been appointed to take his place.

WISLEY IN AUGUST.

VISITORS to Wisley during the present month will find the greatest concentration of flower in the Herbaceous borders, but many interesting and decorative plants are still to be seen in the Rock garden, the Wild garden and the standard collections, which include Dahlias, Montbretias and border Chrysanthemums, the earliest of which will be opening now.

Several good, late-flowering shrubs may be noted growing against the walls of the Laboratory. Here the large single flowers of Rose 'Mermaid' are freely produced against a background of glossy foliage; *Hypericum* 'Rowallane Hybrid' has large, cup-shaped, Buttercup-yellow blooms. *Indigofera pendula*, although regularly cut by winter frosts, grows rapidly and displays its slender purple racemes over a long period. *Abelia Schumannii* is another shrub of elegant habit whose tubular rosy blossoms open in succession for many weeks.

At almost any time of the year the Half-hardy house can show some uncommon plants. At the present time *Haemanthus coccineus* produces its brilliant, vermilion-bracted heads, which rise rapidly from the rough, squat bulbs, the large and ungainly leaves having withered. *Pelargonium Schottii* still continues to carry plenty of purplish-crimson flowers, and *Mandevilla suaveolens* is wreathed with fragrant white clusters. Hybrid Nerines planted in the beds respond generously to this mode of treatment.

One of the most spectacular occupants of the Temperate house, flowering now, is the tropical American *Solanum Wendlandii*, whose large lavender panicles hang in abundance from the roof. *Plumbago capensis* is at the height of its beauty, and the large, white, rose-centred cups of *Hibiscus Waimeae* never fail to win admiration. Two late-flowering species of *Rhododendron* are particularly noteworthy:

R. Kyawi, a crimson-flowered shrub from Upper Burma, is not sufficiently hardy to withstand in the open the rigours of the average Wisley winter; *R. Lochae*, an Australian species rare in cultivation, has loose strusses of well-shaped, long-lasting, Geranium-red blooms. See Fig. 88. Fuchsias, Pelargoniums and Oleanders all contribute bright and varied colour throughout the month.

Some of the earlier-flowering occupants of the Herbaceous borders were mentioned in the July notes, and during August interest is maintained by a long and varied succession of good things. Masses of colour are supplied by the varieties of Phlox, Helenium, Rudbeckia and Monarda, and these are supplemented by many less familiar plants such as *Hedysarum coronarium*, resembling a crimson Galega, *Verbena bonariensis*, an excellent back-row plant with lightly-branched violet panicles, *Salvia farinacea* with Lavender-like blue spikes, *Dimorphothea Ecklonis*, a sun-loving South African Daisy of purest white, and modern varieties of Heliopsis, which are shapely orange-yellow Sunflowers of medium height.

Entering Seven Acres from the lower end of the borders visitors will find a large and shapely specimen of the Californian *Aesculus parviflora* with erect, candle-like white inflorescences, one of the few shrubs still flowering here. *Spiraea Billardii* and the forms of *S. japonica* strike a bright note in rose and crimson and the purple plumes of *Buddleia Davidii* are much in evidence, but a hint of the approach of autumn is given by the heightening colour of leaf and berry in some species of Ribes, Euonymus, Cornus and Berberis. Pleasant patches of colour are formed in the Heath garden by the many varieties of *Erica cinerea* and *E. vagans*, the taller *E. stricta*, still opening rosy-pink bells above faded, rust-tinted clusters, and the variously-coloured forms of Ling (*Calluna vulgaris*).

In the Rock garden many plants of merit are flowering. Gentians are represented by *G. Farreri*, *G. ornata* and *G. lagodechiana*, and equally attractive are the blue or purple flowers of *Cyananthus integer*, *C. lobatus* and *C. Sherriifii* nestling among their delicate trailing stems. *Ruta patavina*, the yellow 'Padua Rue,' is an excellent plant for a sunny spot, as is *Sedum populifolium*, a very distinct, semi-shrubby species with Hawthorn-scented pink flowers, long known in gardens and figured a hundred and fifty years ago in the *Botanical Magazine*. *Platycodon grandiflorum*, *Zauschneria californica*, *Penstemon campanulatus* and *Anagallis collina* are all worth seeing. *Thalictrum kiusianum*, *Verbascum spinosum* and *Amaracus Dictamnus* are a few choice species flowering in the Alpine house.

In the Vegetable Trial ground, which is situated in Wisley village near the Commercial Fruit Trials, will be found large collections of vegetables raised from seed received from the U.S.A. The trial of Carrots comprises one hundred and fifty stocks; nearly one hundred stocks of Onions are approaching maturity, and among the Tomatos are included the varieties which were recommended in the trials of 1941. There are smaller, but still comprehensive, collections of Lettuce and Endive, Beet, Chard, Runner Beans, Sweet Corn, Turnips, Marrows, Cucumbers, Squashes and Potatos. The experiment planned to show the effects of storing Onion sets of various sizes at different temperatures is well advanced, and there are indications of some interesting and valuable results. Another plot is devoted to the production of Onion sets for next year's planting from seed sown during the present season.

THE WAR-TIME KITCHEN GARDEN.

AUGUST.

*Seed Saving and Storing.**—Much of the seed used in English gardens normally comes from abroad, and therefore will not be available ; yet the demand for vegetable seeds is greater at the present time than ever before. The greatest economy should be observed when sowing and the amateur grower can also help by saving his own seed in certain cases. Most of the vegetables now grown are the result of hybridisation and selection ; some types tend to hybridise naturally to a considerable extent, notably the Cabbage family, and the resultant offspring are unlikely to resemble their parents in their good qualities, so that it is unwise to attempt to save seed of Cabbages, Kales, Turnips, etc., without expert knowledge and the means of preventing cross-pollination. Bees fly a long way and may bring pollen from a neighbouring garden or allotment.

Both Peas and Beans, however, are easy to save ; but they must be thoroughly ripened, so that a few plants of an early sowing should be set aside to give ample time to ripen the pods before autumn. No pods for eating should be picked from the plants intended for seed ; poor results will be obtained if the last few pods on plants which have borne heavy crops are reserved for seed.

Onion seed can be saved at home, and for this purpose one or two sound bulbs should be selected from store and planted in February or early March when they will throw flowering spikes ; it is as well to stake the flower stems as they will be ripening when the bulb is losing its roots and so may easily be blown over in windy weather. Leek seed should be collected, if possible, as the supply will be short ; one or two good plants can be left in and allowed to produce flowers ; the seed ripens rather slowly, and it may be necessary to cut the heads and bring them into the shelter of a greenhouse or dry shed to complete the process.

The seed of Carrots and Parsnips is also worth saving ; the production of flowers can be assured by planting in spring a few well-formed roots saved from the previous year. Seed should not be saved from plants that have ' bolted.'

Tomatos allowed to ripen on the plant can be used for seed, choosing well-shaped fruits that have matured early. Marrows and Cucumbers can produce edible fruits without pollination, so that if seed is required, female flowers should be hand pollinated to ensure sound seed.

All the seeds on a plant are unlikely to ripen at the same time ; with Peas and Beans the foliage begins to turn yellow as the pods mature and, rather than pick the latter, it is best to pull the plants up entire and hang them in a dry airy place until all the pods are ripe. With Carrots and Parsnips, both of which are umbellifers and have a number of flowers produced in each umbel, these will ripen unevenly and the earliest may fall before the youngest are ripe ; therefore the whole inflorescence should be cut as soon as the first seeds are ripe and inverted into a paper bag which is hung up till all the seeds are ready.

A dry seed is still a living entity though dormant for the time being ;

* The Ministry of Agriculture has just published a " Dig for Victory " Leaflet No. 21, *Saving your own Seed*. It is obtainable from The Ministry of Agriculture and Fisheries, Lindum Hotel, St. Anne's, Lytham St. Anne's, Lancs.

it should be stored carefully in suitable conditions, that is in a dry, cool, frost-free place but not air-tight ; the best container for the seed of a dry fruit is its own pod and, where there is only a small quantity, Peas and Beans can be kept in cardboard boxes in the pods ; the seeds are then removed immediately prior to use.

As the flesh surrounding the seeds in a Tomato will ultimately decay, they should be taken out as soon as the fruit is fully ripe, washed to remove the pulp and dried at once.

Seed intended for sowing should never be dried by artificial heat or its vitality will be impaired ; on a wholesale scale there are various well-controlled methods of drying and cleaning seeds which are not applicable by the amateur, who should rely on sun heat only, though protection from the direct rays is desirable. Paper envelopes, cardboard boxes or cloth bags are the best receptacles ; there is a danger of mildew developing on seeds kept in air-tight tins, but whichever type of container is used it must be kept in some place where rats or mice cannot get at the contents.

Work to be Done.—Spring Cabbages should be sown in the first week in the south ; they will already have been put in a week or so earlier in the north ; also in the first week of this month it is worth trying a last sowing of early Carrots to be used during winter and spring. Turnips can still be sown and Winter Spinach should go in. Towards the end of the month, or even in the first week of September, a hardy variety of Lettuce for use in spring can be sown in a sheltered place to stand the winter. August-sown Onions will have a longer growing period than those sown in spring, but will need transplanting ; in the north they should be sown early in the month, towards the end would be time enough in the south ; suitable varieties must be chosen. In the early part of the month, too, all space available should be filled up with the green crops.

Crops Available from the Garden in August.—Beet, Carrots, Cauliflowers, Dwarf Beans, Lettuces, Marrows, Onions, Potatos (early), Ridge Cucumbers, Runner Beans, Tomatos, Turnips.

The Fruit Garden.—The time to prune summer fruiting Raspberries is as soon as the fruit has been gathered, and all but the late varieties will have been picked by the end of the month. Pruning consists of cutting right down to ground level all the old fruiting canes, leaving the new canes which will bear fruit next summer. These new canes will in many cases require thinning out and a good guide is to take away the weak canes until each stool has only six to eight of the strongest canes left. Where a support is provided tie in the canes 5 to 6 inches apart and the remainder can then be cut out. Tie loosely. Suckers, unless required for planting, should be pulled up. If the Raspberries are pruned as soon as the fruit has been picked the new canes become thoroughly ripe because sun and air can get to them.

Black Currants bear on the previous year's wood as well and they should also be pruned as soon as the last of the fruit has been picked. Pruning consists of cutting out as much as possible of the old fruiting wood, leaving the new shoots, particularly those which have developed from near ground level. When there are plenty of these new shoots coming from low down the old wood should be cut right out. On the other hand, if there is a shortage of new shoots from low down, cut the old shoots back to where new shoots have arisen. By taking away the old wood the new shoots get a chance to become well ripened before the growing season finishes.

Strawberry runners layered last month should be kept well watered and as soon as the young plants have made good roots cut the runner connecting them to the parent plant. Keep watered if necessary for another week, when the plants should be ready for transplanting to the fruiting bed. The new bed should be prepared about ten days before planting by bastard trenching, placing a good layer of farmyard manure about 5 to 6 inches below the surface of the soil. Tread the soil to make it firm. Rake level. Allow 2 feet between the rows and 18 inches between plants. Plant firmly but not deeply, keeping the crown of the plant slightly above soil level. If necessary water after planting. If planting is done by the beginning of September a crop should be obtained next year.

The early dessert Apples, such as 'Beauty of Bath,' 'Mr. Gladstone,' 'Langley Pippin,' etc., will be ready for gathering this month. These early varieties do not keep their flavour for any length of time and should be used as gathered from the tree. With the early cooking varieties like 'Early Victoria,' 'Lord Suffield,' etc., make successional pickings before the fruit is mature in order to avoid a large amount of fruit being ready for use during a short period.

In normal years it is usual in the late Vinery to employ a little pipe heat during cold nights or wet days. With the present coal shortage pipe heat should not be used and varieties such as 'Lady Downe's Seedling,' 'Alicante,' etc., can be encouraged to finish by judicious ventilation and watering. Give free ventilation whenever possible and if watering is necessary do this in the morning so that the atmosphere is fairly dry by nightfall. Employ full air in the early Vinery in order to ripen the wood.

LILIUM GIGANTEUM

By F. J. ROSE.

Lilium giganteum is the largest and most noble of the genus. It is essentially a plant for the woodland and with most other species of Lilies will prolong the flowering season of the garden with a valued and added interest for the occasional visitor. It is not a fastidious species though it asks for a deep moist soil, shade from the mid-day sun, and protection from wind. Here in the south it flowers from the last week in June to the second week in July and is always a source of attraction, not the least of which is its strong scent.

L. giganteum is best planted in groups of twelve to eighteen, not less than 9 feet from the walk, and sites should be selected where the flowers may be seen from a distance, or they can be planted behind some tall trees or shrubs where they may surprise the visitor. The plants will reach a height of 10 to 12 feet, and as many as twenty-six flowers have been counted on a stem.

It is well known that the plant dies after flowering, and the usual method of propagation is by the young bulbs found round the base of the parent plant. These are of various sizes and may number up to fifteen. Care should be taken in planting to select bulbs of similar size for each group. This will ensure that all will flower the same year. A small proportion of these young bulbs may flower the first year from

planting, but the stems will be small and the flowers few in number. Others may take from two to four years to mature.

Seed of *L. giganteum* may be sown in the same way as other species, and the best time to sow is in the autumn—the seed is usually ready in October. It will also germinate freely if scattered in selected places in the wood, and the seedlings will flower in from five to seven years. Experience has proved that plants obtained from seed will produce much stronger stems with more flowers than those from offset bulbs. This may be clearly seen in the accompanying photographs (Figs. 84 and 85).

Shallow planting is essential. The bulbs should be set so that the "nose" of each is level with the surface of the ground. If deep planting is practised it will be found that the bulbs will work their own way to the surface before making progress.

The species does not appear to be deep rooted and is not particular as to soil provided it contains plenty of humus. Here it has done equally well in very light, medium and heavy soils. Abundance of moisture is, however, necessary during the growing season, and it is wise therefore to select a spot where the soil is not likely to dry out, but where the drainage is good. Such sites may be found at the base of a bank or slope facing north. These sites have the additional advantage of allowing a gradual thaw should late spring frosts occur, and of being cool should the weather be hot and dry at flowering time. A plan we have followed with success is to add some 6 inches of soil to the surface in which to plant the bulbs. This keeps the bulbs moderately dry in winter and allows the thick fleshy roots to penetrate to the moisture below during the growing season.

In replanting, well-rotted manure may be added to the soil or may be mixed with any new compost which may be used. It is necessary, however, to emphasize that the manure must be thoroughly rotted, for this Himalayan species appears to resent "green" manure. A mulch of cow manure used one year was not a success. The surface roots died, the plants were stunted, and easily blown over by the wind.

The bulbs are quite hardy, though the young growths may be injured by late spring frost. A light covering of bracken will obviate this difficulty. The growths lift the bracken as they grow and the covering may be removed when danger from frost is over.

At the time these few notes are being written our country has been at war nearly three years and in consequence practically all work on Lilies has ceased. No *L. giganteum* have been replanted and the result is easy to see. The bulbs are crowded, and though a good proportion flower the stems are short and stunted and the flowers few in number. Many are probably finding that though it may take a long time to make a garden, it takes but a short time to lose it if neglected.

The variety *yunnanense* is somewhat dwarfer than the type plant, reaching a height of about 7 feet only. The stems and leaves are darker in colour, and the flowers tinted red inside. Treatment should be the same as for the type plant. We have not yet flowered this variety at Townhill and I hope to write of it at a later date.

PEAS.

By C. V. FELS.

It is more necessary now than at any period to give consideration to the growing of vegetables. Amongst vegetables few are more nutritious than culinary Peas, also no other leguminous crop is to the gardener, market grower and seedsman so complicated, for they comprise so many names and varieties that a summary classifying their special features should prove of some assistance, as the introduction of names and varieties increases each year. Culinary Peas also are the most important crop grown, excluding Potatoes, many thousands of acres being devoted to their cultivation each year.

My system of classification differs considerably from previous publications which fail or give little information regarding the length of time the varieties are maturing, that is when the first picking should be available. This information I consider is of outstanding importance in order that growers can arrange a succession of pickings, as far as is practicable; but the task is rather more formidable than one would expect, as I have before me records of well over 1,400 names, the majority unfortunately being synonyms.

I have endeavoured to include all the well-known varieties, amongst which will be some old names that are still to be found in seed catalogues, therefore they should not be excluded for they were distinct in some characteristics, not just re-christened. My list is compiled from records extending over fifty years, the results of trials averaging 1,200 each season, and also from the inspection of trials of crops in this and other countries; in fact garden Peas have been my special study and duty during that long period. I will not attempt to give their history for their origin is uncertain, but records state that they were used by the Romans centuries ago and that their growth in England can be traced to the sixteenth century; my concern is to record or classify the far too many varieties in commerce at the present time. Many readers may wonder why I include so many names in the list, particularly of the first early classes, as when in growth one is unable to detect any difference, they all appear to be similar. My reason for their inclusion is that when they were introduced there was a difference, but as the years have passed seedsmen and growers have utilized the best strain of certain types in place of the older and well-known names; for example, 'Sangster's No. 1,' 'Ringleader,' 'Extra Early,' 'Prince Albert,' 'Daniel O'Rourke,' 'Caractacus,' 'First and Best,' 'First Crop,' 'Lightning,' each had some distinguishing feature when introduced; that to-day they are practically the same does not therefore justify their exclusion from the list, otherwise some seedsman, raiser or grower may feel an injustice has been done. In a lesser degree the same applies to other classes, particularly the dwarf wrinkled and maincrop wrinkled.

My classification is based mainly upon trials, extending over many years, of sowings made in the last week of March, daily records being made as to the first flower, the first pod, when fit to pick and the height, etc. It is obvious that weather conditions may hasten or retard the results, particularly conditions immediately following the sowings. I have given all those features due consideration with a real desire to give those interested as correct a grouping as is possible of so difficult and complex a subject. I group or classify them as follows:—

FIRST EARLY DWARF. HEIGHT 18 INCHES TO 24 INCHES.

Round Seeded. First Picking ready in 56 to 60 Days.

'Tom Thumb.'	'Eight Weeks.'	'Meteor.'
'Beck's Gem.'	'Unique.'	'Eldorado.'
'Day's Sunrise.'	'Blue Peter.'	'Bishops Dwarf.'

FIRST EARLY DWARF. HEIGHT 18 INCHES TO 20 INCHES.

Round Seeded. First Picking ready in 65 to 70 Days.

'Pride of the Market.'	'Buttercup.'	'Superb.'
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FIRST EARLY. HEIGHT 18 INCHES TO 24 INCHES.

Wrinkled Seed. First Picking ready in 70 to 80 Days.

'Little Gem.'	'Daffodil Original.'	'Little Marvel.'
'American Wonder.'	'Model Daffodil.'	'Pioneer.'
'Premium Gem.'	'Hundredfold.'	'May Flower.'
'Chelsea Gem.'	'Laxtonian.'	'Peter Pan.'
'Sutton's Forcing.'	'British Wonder.'	'Generosity.'
'Forcing Marrowfat.'	'Marvellous.'	'Sensation.'
'Dwarf Excelsior.'	'Lancashire Lad.'	'Phenomenal.'
'English Wonder.'	'Kelvedon Wonder.'	'Greenmantle.'
'Witham Wonder.'	'The Sherwood.'	'Prelude.'
'Progress.'		

FIRST EARLY. HEIGHT 2½ FEET TO 3 FEET.

Round Seeded. First Picking ready in 75 to 80 Days.

'Daniel O'Rourke.'	'Express.'	'Springtide.'
'Prince Albert.'	'William I.'	'Foremost.'
'Caractacus.'	'William the Con-	'Forerunner.'
'Sangster's No. 1.'	'queror.'	'Tiptop.'
'Ringleader.'	'Pilot.'	'Bountiful.'
'Extra Early.'	'Benefactor.'	'Blue Bird.'
'First and Best.'	'Primo.'	'British Lion.'
'Lightning.'	'Giant Blue Express.'	'Essex Star.'
'Eclipse.'	'Aviator.'	'The Clucas.'
'Earliest of All.'	'Giant Lightning.'	'Market Surprise.'
'Alaska.'	'Early Bird.'	

FIRST EARLY. HEIGHT 2½ FEET TO 3 FEET.

Wrinkled Seed. First Picking ready in 72 to 80 Days.

'Exonian.'	'World's Record.'	'Thomas Laxton.'
'Gradus.'	'Early Duke.'	'Exquisite.'
'Early Morn.'	'Springtide Original.'	'Provost.'
'Early Giant.'	'Bedfordshire	'Banqueter,' Laxton.
'Prosperity.'	'Champion.'	'The Skipper.'

SECOND EARLY. HEIGHT 1½ FEET TO 2 FEET.

Wrinkled Seed. First Picking ready in 75 to 85 Days.

'Advancer.'	'Horsford's Market	'Lincoln.'
'Abundance Bliss.'	'Garden.'	'Wonder Marrowfat.'
'Abundance.'	'Daisy.'	'King Edward.'
'Sutton's.'	'Phenomenon.'	'Dwarf Telephone.'
	'Duplex.'	

SECOND EARLY. HEIGHT $2\frac{1}{2}$ FEET TO 3 FEET.

Wrinkled Seed. First Picking ready in 75 to 85 Days.

'Yorkshire Hero'	'Senator.'	'Early Favourite.'
(original).	'Delicatesse.'	'Miracle.'
'Dr. Maclean.'	'Charles I.'	'The Clucas.'
'Prince of Wales.'	'Giant Stride.'	

EARLY MAINCROP. HEIGHT 2 FEET TO $2\frac{1}{2}$ FEET.

Wrinkled Seed. First Picking ready in 90 to 93 Days.

'Veitch's Perfection.'	'Supreme.'	'Glory of Devon.'
'Yorkshire Hero	'Stratagem.'	'Union Jack.'
Re-selected.'	'Dwarf Defiance.'	'John Bull.'
'Dwarf Monarch.'	'Commonwealth.'	'Juno.'
'Dreadnought.'	'Rentpayer.'	
'Onward.'	'Best of All.'	

MAINCROP. HEIGHT $2\frac{3}{4}$ FEET TO 3 FEET.

Wrinkled Seed. First Picking ready in 90 to 94 Days.

'Lord Chancellor.'	'Mammoth Marrow.'	'Royal Salute.'
'Chancelot.'	'Prestige.'	'Dreadnought.'
'Peerless.'	'Improved Queen.'	'Triumph.'
'Matchless.'	'Danby Stratagem.'	'British Empire.'

MAINCROP. HEIGHT 3 FEET TO 4 FEET.

Round Seeded. First Picking ready in 90 to 92 Days.

'Harrison's Glory.'	'Fillbasket.'	'Gladiator.'
'Blue Imperial.'		

MAINCROP. HEIGHT $4\frac{1}{2}$ FEET TO 5 FEET.

Wrinkled Seed. First Picking ready in 86 to 88 Days.

'Duke of York.'	'Telephone Original.'	'Centenary.'
'Harvestman.'	'Exhibition.'	'Monster.'
'Admiral Beatty.'		

MAINCROP. HEIGHT 5 FEET TO 6 FEET.

Wrinkled Seed. First Picking ready in 90 to 94 Days.

'Alderman.'	'International.'	'Battleship.'
'Duke of Albany.'	'Quite Content.'	'V.C.'
'Duchess.'	'The Daniel.'	'Up to Date.'
'Admiral Dewey.'	'Boston Unrivalled.'	'Prince Edward.'
'Market Gardener.'		

MAINCROP. HEIGHT 5 FEET TO 6 FEET.

Round Seeded. First Picking ready in 90 Days.

'Telegraph.'	'Waterloo' or	'Olympic.'
'Market King.'	'Victorian Marrow.'	

LATE. HEIGHT $3\frac{1}{2}$ FEET TO 4 FEET.

Wrinkled Seed. First Picking ready in 98 to 103 Days.

'Omega.'	'Latest Giant.'	'Late Queen.'
'Michaelmas.'	'Royal Salute.'	'Freedom.'
'Autocrat.'	'Latest of All.'	'Rearguard.'
'Gladstone.'	'St. Duthus.'	

LATE. HEIGHT 5 FEET TO 6 FEET.

Wrinkled Seed. First Picking ready in 95 to 100 Days.

'Ne Plus Ultra.'	'Barnet Hero.'	'Duchess of
'Gold Finder.'	'British Queen.'	Edinburgh.'
'Chelsonian.'	'Late Duke.'	

VARIETIES FAVOURED BY THE CANNING INDUSTRY.

'Charles I.'	'Canner's Perfection.'	'Horsford's Market
'Delicatessc.'	'Admiral.'	Garden.'
'Lincoln.'	'Surprise Gregory,'	'Fairbeard's Non-
'Union Jack.'	small.	pareil.'
'Prince of Wales'		
(original strain).		

'Alaska' is also used in some districts for canning.

'Thomas Laxton' is sometimes used in some districts for canning.

EDIBLE PODDED GROUP.

'Dwarf Sugar.'	'Corn de Belier.'	'Tall Grey Sugar.'
'Dwarf Wrinkled	'Moheims Giant.'	'Paramount Sugar.'
Sugar.'	'Tall Sugar.'	'Melting Marrow.'

Varieties chiefly grown for drying and packeting, and in late years for processing, are the 'Harrison's Glory' type, often grown as 'Lincoln Blue,' about 3,000 acres being harvested in Lincolnshire and Cambridgeshire each year. They are known to the public as Blue Boiling Peas; sometimes 'Alaska' is included.

For the canning factories, the varieties favoured are those which mature most regularly. Several thousand acres are required each year. The leading garden and market garden types are not suitable, although they are larger podded, and superior in quality, but they are irregular in cropping; for canning, it is necessary that there is one picking only.

My grading or classification of Peas unfortunately does not include the many new introductions during the past four years. Some no doubt are of special merit, but I have no records of them; except for those omissions I think it includes all varieties of interest to all growers in the British Isles and Ireland.

It is gratifying to record that the most popular and notable varieties have been raised by English seed houses; also it is of interest to know that most of the garden Peas grown in America are those introduced from England.

I fear that the problem of which is the best variety to grow for a particular purpose is not solved by any grouping or classification, but it should be a guide to those interested.

One of the problems seed houses and Pea raisers have to contend with is the enormous number of synonyms. It is a pity seedsmen, and so-called seedsmen, do not cease the foolish practice of re-naming, thereby causing endless confusion.

(A fuller list giving, in each case, the size of pod, colour and type of seed can be consulted at the Lindley Library, Vincent Square, or at Wisley.—*Ed.*)

THE BROWN ROT DISEASES OF THE APRICOT.

By HUMPHREY DENHAM and H. WORMALD,
East Malling Research Station.

IN the R.H.S. JOURNAL of October 1941 (Vol. LXVI, pp. 370-4) a short account was given of an improved method of cultivating Apricots, and reference was made to a disease which causes "die-back" of shoots and whole branches, and which is believed to be one of the main reasons for the decline of Apricot-growing in this country.

Since that account was written, an examination has been made of material from the trees in the garden mentioned and this, together with observations on specimens seen previously, indicates that one cause of the die-back in Apricots is infection by the Brown Rot fungus *Monilia cinerea* (the name frequently used for the imperfect or conidial stage of *Sclerotinia laxa*), for this fungus has been found on flowers and young leaves, in the tissues of the affected twigs, and on the fruit.

The Brown Rot diseases of the Apricot have not been closely studied in this country, but from general observations it may be inferred that infection by *Monilia cinerea* on Apricots takes place much as in other stone-fruit crops. It has been more carefully followed in the Morello Cherry, where the fungus has been found to produce infection not only through the open flowers but also through unopened flower buds. Infection of flowers in bud of the Apricot has been observed in France, but in the specimens examined by us infection had occurred only after the flowers had opened. The infection arises from spores shed from the fungal fructifications on dead twigs and spurs and mummied fruits left on the trees from the previous year. The spores fall into the flowers, which soon wither (Blossom Wilt), and the fungus then extends into the twigs bearing these dead flowers, to produce lesions which cause the death of those parts above them (Twig Blight). Later the same fungus may infect the fruit to cause Brown Rot. Fructifications of *Monilia cinerea* appear on the surface of infected flowers (particularly on the flower stalks) and fruit as grey tufts consisting of chains of oval or somewhat lemon-shaped spores that serve to spread infection during spring and summer. If the infected twigs and fruit are allowed to remain on the trees the fungus redevelops and appears at the surface in early spring to produce again fructifications and to scatter its spores. As mentioned above it is such dead twigs and spurs and mummied fruit that carry the fungus over the winter and thus cause infection of the flowers as they open.

The disease on the ripening fruit spreads very rapidly and may affect the whole surface within two or three days after the first trace of infection is to be noticed. It usually starts at wounds made by wasps or other biting insects, or by birds, but infection may extend to an uninjured fruit if it is touching one already infected, for the fungus can grow from one to the other at the point of contact.

Monilia cinerea infects not only the Apricot but also the Peach, Nectarine, Cherry, Plum, and a number of ornamental shrubs.* A closely related fungus, *Monilia fructigena* (*Sclerotinia fructigena*),

* *Trans. Brit. Myc. Soc.*, 24, 1940, pp. 20-28.

which causes the common Brown Rot of Apple and Pear fruits, also attacks stone fruits, including the Apricot, but this fungus is not known to infect the flowers, and Brown Rot Blossom Wilt of fruit trees in this country is caused solely by *Sclerotinia laxa*. In America the Brown Rot diseases of the Apricot (Blossom Wilt, Twig Blight, and Fruit Rot) are brought about mostly by another species, *Sclerotinia fructicola*, which is not found in Europe, but in parts of North America bordering on the Pacific Ocean *Sclerotinia laxa* also is found. In Australia and New Zealand the American species *S. fructicola* (and not *S. laxa*) is the only Brown Rot fungus known, but it causes severe losses in stone fruits in some areas. On the Continent Brown Rot of Apricots (caused, as in Britain, by *Sclerotinia laxa*) has at times proved very destructive in Switzerland, France (particularly in the Rhone Valley), Italy, and in Russia in the coastal regions of the Black Sea.

At one time the Brown Rot fungus of Apricot was thought to be a species distinct from the grey Monilia of Peach, Plum and Cherry, but it is now considered that the same species of Monilia attacks all these and also other host plants. The question arises, however, whether there are biologic forms within the species, that is, whether there are specialized forms adapted to infect certain of those hosts only. So far as experiments have gone it may be assumed that there is little specialization of parasitism within the species *Sclerotinia laxa*; one form appears to be more or less confined to the Apple (forma *mali*) causing Blossom Wilt, but the form on other hosts seems to be one and the same and can readily pass from one species of host to others.* Thus it has been found that the fungus on Apricot can infect Cherry flowers, and Cherry and Plum fruits. The reciprocal cross inoculations on to Apricot have not yet been carried out.

A very full account of the Brown Rot diseases of fruit trees is given in a bulletin under that title published by the Ministry of Agriculture and Fisheries in 1938 (No. 88). The chief measure of control is that advocated on pp. 42-4 of that bulletin, the scrupulous removal of all dead and infected material as soon as it is detected. This may consist of shoots showing wilted flowers or leaves, dead twigs and even dead short spurs only half an inch long, and fruit showing any trace of the fungus. It is particularly important that no mummied fruit should be allowed to remain on the branches over the winter, since, like infected wood, they may form an active source for the reinfection of the tree through the open blossoms in the spring. In the absence of any indications of specialized strains of *Sclerotinia laxa* on stone fruits it must be assumed that other species of *Prunus* are potential sources of infection for the Apricot, and the same sanitary measures should be applied to Plum, Cherry, Peach and Nectarine trees in the neighbourhood, as well as any ornamental shrubs of species of *Prunus* that may be in the same garden.

Such precautionary measures should not be impossible in a small garden, and if carried out carefully further attempts at control by spraying should not be necessary, but the detection of all the small dead spurs will perhaps present some difficulty, and it may be found advantageous to supplement the sanitary measures by spraying.

Experiments on the control of the Brown Rot diseases in Apricots by spraying have not yet been carried out in this country, but abroad it is claimed that good results can be obtained by Bordeaux Mixture.

* *Loc. cit.* pp. 26-27.

From observations and experiments in the Rhone Valley, JOËSSEL* recommends spraying twice with Bordeaux Mixture, the first application as the buds are swelling and the second as soon as the petals show between the sepals.

In Switzerland, where the Apricots are a substantial commercial crop, particularly in the Valais, Bordeaux Mixture containing 2 per cent. copper sulphate is normally used as a winter spray. The Imperial Bureau of Horticulture (East Malling, Kent) has recently heard from Dr. FAES, the Director of the Federal Research Station at Lausanne, that for the current year, and in view of the shortage of copper, they are recommending three sprayings :

(a) Pre-blossom : Bordeaux $\frac{1}{2}$ per cent. or copper carbonate 0.2 per cent.

(b) After petal-fall : copper carbonate 0.2 per cent., plus lead arsenate.

(c) End of June or beginning of July, on young fruits : copper carbonate 0.1 per cent.

At the East Malling Research Station experiments have been carried out over a number of years on the control of blossom wilt in Morello Cherries caused by the same fungus, and it has been found that the incidence of the disease can be reduced considerably by cutting out dead or dying infected twigs when they are most conspicuous, i.e. about three weeks after the trees come into flower, by spraying the trees with tar-oil in winter, and by spraying with Bordeaux Mixture immediately before the flowers open.

For Apricots therefore we advise growers to try (1) a tar-oil spray in winter, as late as possible but before the buds begin to swell†; (2) spraying, just before the flowers open, with Bordeaux Mixture prepared at the rate of 10 oz. copper sulphate and 15 oz. hydrated lime per 10 gal. water; (3) cutting out as many infected twigs and spurs as possible, preferably in spring about a fortnight or three weeks after the trees come into bloom, for then the infected twigs with their dead or withering flowers and leaves are more noticeable than they will be if left on the trees until the winter. If these suggestions are carried out further treatment during the summer will probably be unnecessary.

SUMMARY.

One cause of "die-back" in Apricot trees is infection of twigs and branches by the Brown Rot fungus *Monilia cinerea* (*Sclerotinia laxa*).

Infection by this fungus results in blossom wilt, twig blight, and fruit rot.

Measures for the control of these diseases are suggested.

* Joëssel, P. H. (1932), 'Le Problème du Monilia de l'Abricotier dans la Vallée du Rhone,' *Bull. de l'Office Régional Agricole du Midi*, No. 44, 69 pp.

† This would help to keep in check the aphid population also, but has caused damage in the past in the garden mentioned, and should be used with caution.

THE EFFECT OF TEMPERATURE AND THE MOON ON SEEDLING GROWTH.

By M. MATHER,

John Innes Horticultural Institution, Merton, London.

THE possible effect of the moon's phases on seedling growth has been the subject of much discussion at various times. It has been claimed that better crops are obtained from seeds planted when the moon is waxing, than from those sown when it is on the wane. MATHER and NEWELL have described experiments on the relation of seed germination to the moon's phases, in this JOURNAL (October 1941). They failed to find any regular effect of the moon, but their results concerned only germination, and it seemed desirable to extend the experiments to cover seedling growth.

These new experiments were designed to show how the growth of young plants was affected, not only by the moon, but by other varying conditions such as temperature and light. Observations on the germination of the seeds were also made, and form an extension of MATHER and NEWELL's results.

THE EFFECT OF THE MOON.

As both Tomatos and Maize are reputedly sensitive to lunar effects they were chosen as the experimental plants. 'Sunrise' was the only Tomato used, but two strains of Maize were brought into the experiment. One of these, called Maize 1, was a non-commercial strain of starchy corn, while the other, Maize 2, was the John Innes hybrid Sweetcorn.

The plants were all grown in the glasshouse, where it was possible to control certain physical conditions, viz. soil composition, water, and to a certain extent minimum temperature. The maximum temperature, and also the light, varied according to the outside weather. In order to obtain results from several complete lunar cycles, sowings were made over a period of four months. Seeds were planted two days before each phase, starting in the case of Tomato and Maize 1 on the full moon on April 9, and continuing up to and including the full moon on August 5. Thus there were seventeen sowings in all. The first of the seventeen sowings of Maize 2 was made on May 9, the last on September 3. The seeds were sown in boxes of John Innes potting soil, each box containing twelve seeds. Two boxes were sown of each of the various plants each time. In this way, any effect of variation in soil or watering could be observed, and due allowances made for it. It will be seen later that the use of such duplicate sowings made possible the detection of a very curious effect in the two Maize strains. The two boxes used for each sowing are referred to below as Box A and Box B. Watering was carefully handled, the moisture content of the soil being kept as constant as possible.

After sowing, the boxes were examined every day, and a record was kept of the dates on which half of the seeds in each box had germinated. A Tomato seed was considered to have germinated when the cotyledons had opened out, a Maize seed when the shoot was visible through the soil. The results obtained are shown graphically in Fig. 91, where the full moon sowings are marked by upright dotted lines.

It appears from this figure that the moon has no consistent effect. Admittedly in July, germination was quicker on the waxing phase,



FIG. 83.—STRAWBERRY 'CORVALLIS' AT WISLEY, 1939
(One-year-old plants)
(See p 250)



FIG. 84 - *LILIUM GIGANTEUM* FROM SEED
These plants took seven years to flower from seed
(See p 256)



FIG. 85.—*LILIUM GIGANTEUM* FROM OFFSET BULBS.
(See p. 256.)



Photo. N. K. Gruttl]

FIG. 86.—*SEDUM POPULIFOLIUM* AT WISLEY
(See p. 252.)



Fig. 87 -- RHODODENDRON CHRYSASPIS
(See p. 278.)



FIG. 88. -RHODODENDRON LOCHAE
(See p. 252.)



FIG. 89 SYRINGA ' MAUREEN '

(See p 279)



FIG. 90. *CELSIA V. ALBIS*
See p. 276.

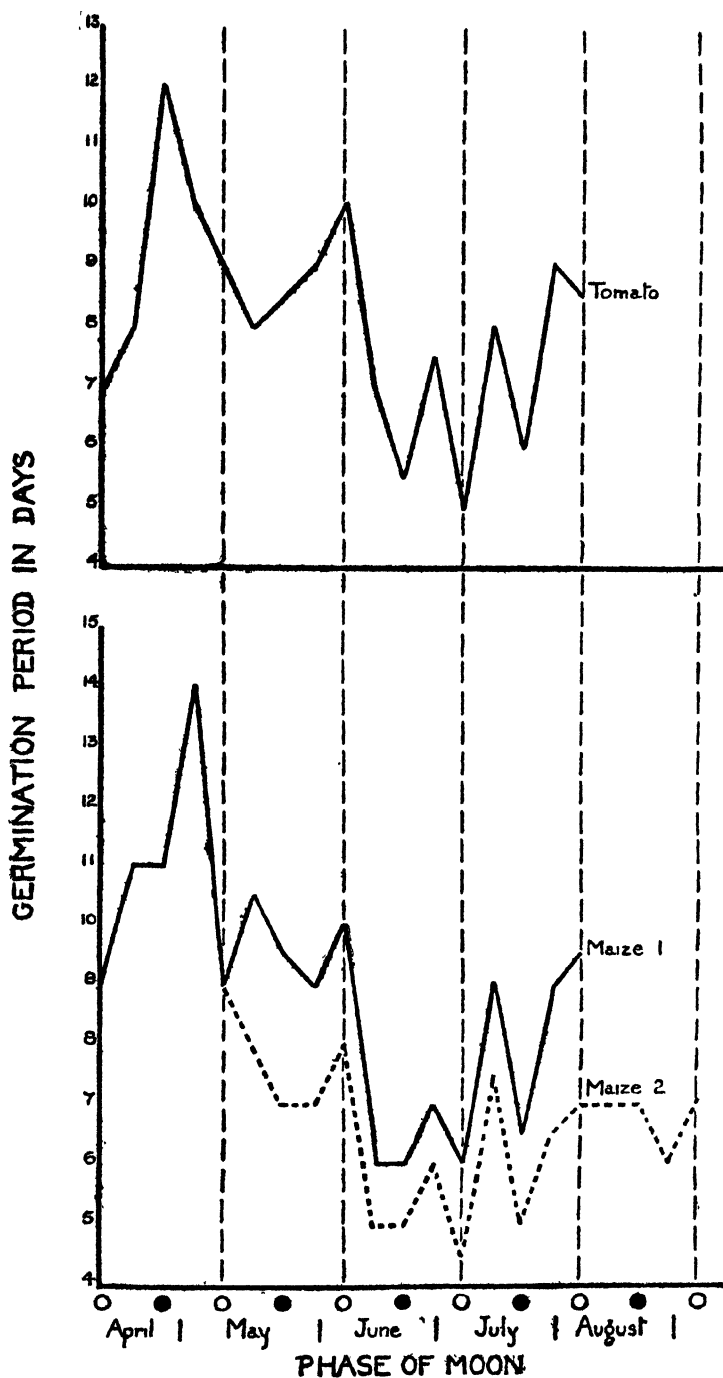


FIG. 91.—The number of days from sowing to germination of the three experimental plants, plotted against the times of sowing, in each case two days before the quarter of the moon.
(See p. 264.)

and there was a marked slowing down on the waning one ; but the waxing and waning quarters of the June moon showed just the opposite effect. Again the same phases of the May moon show in the case of Maize 1 an opposite effect to the corresponding quarters in June, while in the case of Tomato there is a steady speeding up in germination continuing through both the waxing and waning phases.

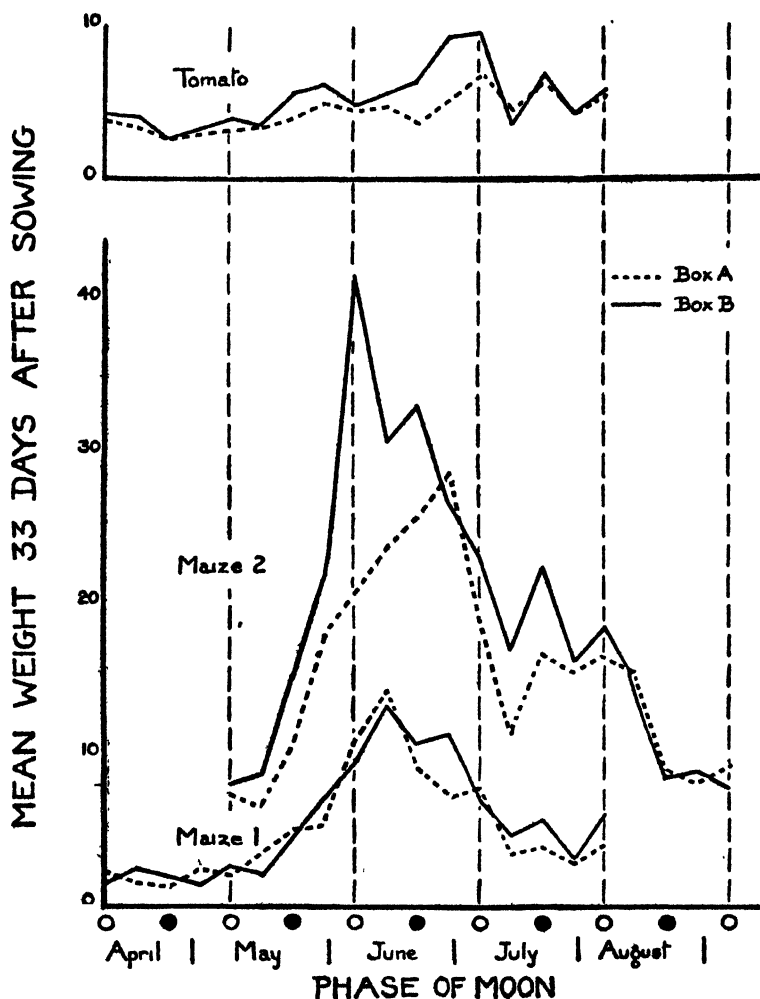


FIG. 92.—The average weight of the twelve plants in each box thirty-three days after sowing, when planted two days before the quarter of the moon against which they are plotted. (See p. 267.)

These results are also tabulated in Table 1, where the first column of figures gives the mean germination time in days for the seeds in boxes A and B, while the second column gives the average of two boxes. Column three contains the values of the monthly or moving averages as used by MATHER and NEWELL. Each one of these is the average for a full lunar cycle centred on the particular phase of the moon against

which it is entered. The formula for finding the moving average centred on a full moon, for example, is

$$\frac{1}{4} \left(\frac{\bullet}{2} + \circ + \circ + \left(+ \frac{\bullet}{2} \right) \right)$$

Thus the figures corresponding to the sowing of Tomatos on May 9 are

$$\frac{1}{4} \left(\frac{12}{2} + 10 + 9 + 8 + \frac{8.5}{2} \right) \text{ or } 9.313.$$

The fourth and last column gives the departures of the observed averages (Column 2) from the moving averages. A — sign indicates that the germination was quicker than the moving average led us to expect. The differences between the values observed and the moving averages show no consistency, as can be seen from the summary in

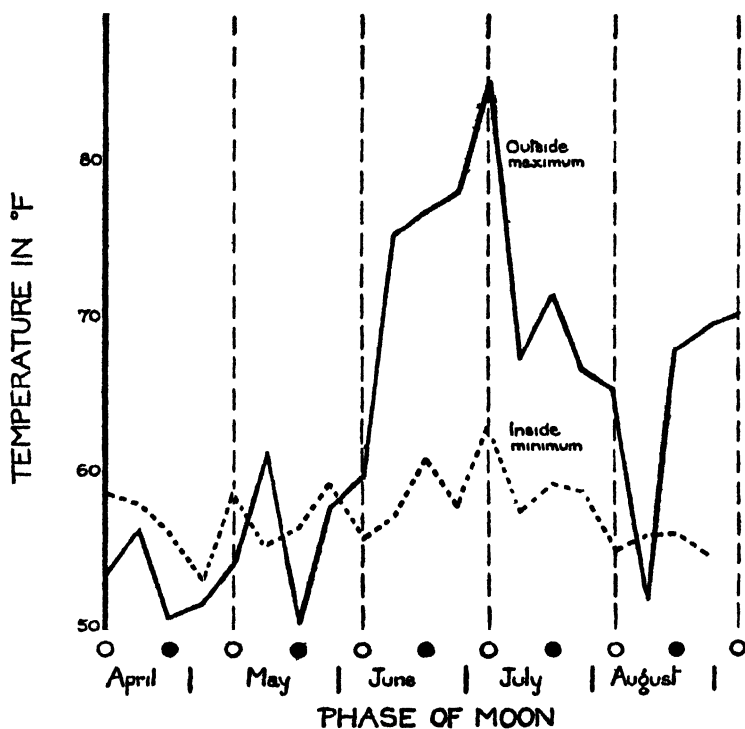


FIG. 93.—The average outside maximum and inside minimum temperatures of the seven days following each sowing date, plotted against the moon's phases, two days before each of which sowings were made.

(See p. 268.)

Table 1A. No phase of the moon regularly gives specially quick or specially slow germination.

The influence of the moon on the growth of young plants after the germination stage was also followed. Thirty-three days from the date of sowing the shoot of each plant was cut off at ground level and its weight in grammes recorded. The average weight of the plants in each box is shown graphically in Fig. 92, and is also tabulated in Tables 2 and 2A, in the same way as the germination results were set out in Fig. 91 and Tables 1 and 1A. Again it is found that there is no consistency in the way the weights either rise or fall with any given phase

of the moon. In Maize 1, for example, each plant sown on the first quarter late in June was approximately 5.19 grammes heavier than one sown on the next waning phase. In the first quarter of the previous lunar cycle, however, plants were each approximately 7.53 grammes lighter than on the last quarter. A calculation of the moving averages confirmed these findings (Table 2). A different cause can be found for these weight fluctuations if temperature is considered. A reference to Fig. 93, which gives the maximum and minimum temperatures in the glasshouse during the experiment, shows that all through June the maximum temperature was tending towards its highest point, the peak being reached at the July 6 full moon. This shows that sowings made in the waning and waxing phase in June and early July had the advantage of higher temperatures. Hence it would appear that increased growth was due, not to any influence the moon might have, but merely to a rise in temperature.

THE EFFECT OF LIGHT AND TEMPERATURE.

These experiments fail to show that the moon has any consistent effect on germinating and growing plants. They do, however, show effects of both light and temperature. A remarkable effect of light is brought out by the differences between duplicate sowings made at the various times. The pairs of boxes were placed on the main staging in the glasshouse, one behind the other, Box A being nearer the side glass, Box B closer to the gangway. In the case of Tomato and Maize 2 the plants in Box B were regularly larger than those in Box A. Maize 1 showed no such consistent difference (Table 2). A statistical analysis of the figures fully confirms this conclusion. The small differences between Box A and Box B in Maize 1 are only reflections of the natural variability of the plants growing in the same box, but the differences in the Tomato and Maize 2 must be regarded as real.

The remarkable feature is that two strains of Maize differ in their reaction to light. It may be noted that it was the commercial and hence the more vigorous variety of Maize which behaved in the same way as the Tomato and produced smaller plants when nearer the glass. The non-commercial and less vigorous Maize plants were not so sensitive to these variations in light conditions. Whether this peculiarity is always related to vigour of growth cannot be said at the moment.

The second point of interest arose in connection with the effect of temperature changes on the plants' growth. On examining Fig. 92, which shows the mean weight thirty-three days after sowing plotted against the times of sowing, it is seen that the largest Tomato plants were produced from seeds planted during the last week of June and the first week of July, when the temperature was reaching its highest point. The largest Maize plants, however, were produced from sowings made a month earlier, i.e. during the first week in June. Though increased temperature causes greater growth in both Tomato and Maize, the stage at which this rise in temperature is most effective is not the same in both plants. In the case of Maize seeds sown on June 7 and 14, the plants were two to three weeks old before the high temperatures occurred, while the Tomato seeds sown on June 22 and 30 had only just germinated. Thus the effect of higher temperatures on a Tomato plant is greatest immediately after germination, but a Maize plant does not fully react to a rise in temperature until a later stage when it has become well established.

TABLE I.
GERMINATION TABLE.

TOMATO.					MAIZE 1.				MAIZE 2.				
Date of Sowing.	Phase of Moon.	Germination Time. Box A. B.	Average.	Moving Average.	Departure from Moving Average.	Germination Time. Box A. B.	Average.	Moving Average.	Departure from Moving Average.	Germination Time. Box A. B.	Average.	Moving Average.	Departure from Moving Average.
April 9	☉	7	7.0			9	9.0						
April 16	☾	8	8.0			11	11.0						
April 24	☾	13	12.0	9.500	2.500	11	11.0	11.250	-0.250				
May 2	☾	10	10.0	9.750	0.250	14	14.0	11.188	2.812				
May 9	☾	9	9.0	9.313	-0.313		9.0	8.438	0.562	9	9.0		
May 16	☾	8	8.0	8.750	0.750	10	10.5	10.125	0.375	8	8.0		
May 24	☾	9	8.5	8.750	-0.250	9	9.5	9.625	-0.125	7	7.0		
May 31	☾	9	9.0	8.750	0.250	9	9.0	9.188	-0.188	7	7.0		
June 7	☾	10	10.0	8.250	1.750	10	10.0	8.188	1.812	8	8.0		
June 14	☾	7	7.0	7.688	-0.688	6	6.0	7.500	-1.500	5	5.0		
June 22	☾	5	5.5	6.875	-1.375	6	6.0	6.750	-0.750	5	5.0		
June 30	☾	7	7.5	6.375	1.125	7	7.0	6.625	0.375	6	6.0		
July 6	☾	5	5.0	6.563	-1.563	6	6.0	7.063	-1.063	5	4.5		
July 14	☾	8	8.0	6.813	1.187	9	9.0	7.375	1.625	5	4		
July 22	☾	6	6.0	7.438	-1.438	7	6.5	8.063	-1.563	5	5.0		
July 29	☾	9	9.0			9	9.0			6	6.5		
Aug. 5	☾	9	9.0			9	9.5			7	7.0		
Aug. 13	☾	8	8.5			10				7	7.0		
Aug. 20	☾									7	7.0		
Aug. 27	☾									6	6.0		
Sept. 3	☾									7	7.0		

TABLE 1A.

TOMATO.					MAIZE 1.				MAIZE 2.			
Phase of Moon.	Phase of Moon.	Average.	Average.	Average.	Average.				Average.			
☾	☾	0.250	1.125	0.542	2.812	-0.188	0.375	1.000	-0.125	0.562	0.062	0.166
☾	☾	2.500	-1.375	-0.141	-0.250	-0.125	-0.750	-0.672	-0.625	-0.563	-1.188	-0.532
☾	☾	-0.750	-1.187	-0.084	0.375	-1.500	1.625	0.167	-1.125	1.687	0.187	0.250
☾	☾	-0.313	-1.563	-0.042	0.562	1.812	-1.063	0.437	1.500	-1.250	0.375	0.208

SEEDLING WEIGHT.

TOMATO.					MAIZE 1.				MAIZE 2.			
Date of Sowing.	Phase of Moon.	Mean Weight after 33 Days. Box A. Box B.	Average.	Moving Average.	Departure from Moving Average.	Mean Weight after 33 Days. Box A. Box B.	Average.	Moving Average.	Departure from Moving Average.	Mean Weight after 33 Days. Box A. Box B.	Average.	Moving Average.
April 9	☉	3.97	4.24	4.105		2.16	1.98	2.070				
April 16	☾	3.73	4.02	3.875	-0.924	1.58	2.37	1.975	-0.249			
April 24	☉	2.50	2.51	2.505	-0.168	1.50	1.95	1.725	0.112			
May 2	☾	2.01	3.15	3.030	3.198	2.27	1.75	2.010	0.265			
May 9	☉	3.04	4.09	3.505	3.449	2.12	2.48	2.300	-0.305	7.15	8.09	7.620
May 16	☾	3.34	3.68	3.510	4.045	3.04	2.22	2.930	-0.567	6.65	8.93	7.790
May 24	☉	4.05	5.70	4.875	4.456	5.00	4.27	4.635	-0.374	10.94	15.15	13.045
May 31	☾	4.80	6.05	5.425	4.738	5.22	7.25	6.235	-1.112	19.770	21.73	19.770
June 7	☉	4.25	4.67	4.460	4.923	10.35	9.99	10.170	0.812	29.96	41.48	35.720
June 14	☾	4.44	5.30	4.870	5.151	14.04	13.49	13.785	3.628	23.96	30.75	27.355
June 22	☉	3.73	6.26	4.995	5.806	8.85	10.92	9.885	-0.521	27.27	32.94	30.105
June 30	☾	5.12	9.16	7.140	6.001	7.22	11.21	9.215	0.379	28.64	26.57	27.605
July 6	☉	6.79	9.17	7.980	5.940	7.22	6.88	7.350	-0.376	18.95	23.20	21.075
July 14	☾	2.28	3.54	2.910	5.794	3.50	4.54	4.020	-1.520	11.25	17.07	14.160
July 22	☉	6.57	6.36	6.465	5.185	3.91	5.56	4.735	0.265	16.60	22.10	19.350
July 29	☾	4.09	4.01	4.500		2.80	2.99	2.895		15.43	16.00	15.715
Aug. 5	☉	5.63	5.87	5.750		4.20	6.02	5.110		16.31	18.42	17.365
Aug. 13	☾									15.27	14.85	15.060
Aug. 20	☉									9.02	8.54	13.322
Aug. 27	☾									8.15	8.75	8.450
Sept. 3	☉									9.06	7.73	8.395

TABLE 2A.

TOMATO.					MAIZE 1.				MAIZE 2.			
Phase of Moon.	Average.		Average.		Average.		Average.		Average.		Average.	
☉	-0.168	0.687	1.139	1.280	0.553	0.112	-1.112	0.379	-1.757	2.719	-1.040	-0.026
☾	-0.924	0.419	-0.811		-0.036	-0.249	-0.374	-0.521	-2.524	1.739	2.238	-0.345
☉	-0.465	-0.281	-2.884		-1.210	-0.567	3.628	-1.520	-1.862	-4.902	1.738	-1.675
☾	0.116	-0.463	2.040		0.564	-0.305	0.812	0.376	9.615	-0.935	1.814	3.498

THE EFFECT OF VITAMINS IN YEAST EXTRACT UPON THE GROWTH OF TOMATOS.

By M. A. H. TINCKER, M.A., D.Sc.

INTRODUCTION.

WORKING in California, BONNER and GREENE (1939) reported that the addition of small quantities of vitamin B₁ to the culture solution supplied to certain plants growing in sand accelerated development and growth. Seedlings of *Daphne odora*, *Camellia japonica* and *Cerantonia siliqua* responded favourably. Further tests with selected plants grown in soil were also reported to have given positive results. Tomatos and garden Peas did not show any stimulation, and BONNER and GREENE observed that these plants usually contain a high concentration of vitamin B₁ in their leaves.

By this and other similar reports widespread popular interest was quickly aroused in America and many advertisements claimed remarkable results from the addition of small quantities of their proprietary substances containing the vitamin. More critical results were, however, soon forthcoming.

In the *American Rose Annual*, ZIMMERMAN (1941) has now reviewed the position. Amongst other negative evidence he mentions HAMNER's work, and in his own experiments made with HITCHCOCK (1940 and 1941), ZIMMERMAN tested eighteen species growing in soil and failed to observe stimulation. In his later experiments no stimulation was observed with plants in pots but there were some positive indications with China Asters grown in the early stages in boxes. TEMPLEMAN and POLLARD (1941) reported tests made in this country recently; they added vitamin B₁ and nicotinic acid to the solutions used for Oats and Tomatos and did not observe any effects on the yields due to this addition.

EXPERIMENTAL.

During 1941 an experiment was carried out at Wisley using an extract of yeast (*Torula utilis*) kindly provided by Dr. A. C. THAYSEN, The Chemical Research Laboratories, Teddington. 10 gms. of dried yeast were extracted with 90 ccs. of water at pH 4.3 for 5 minutes at atmospheric pressure, followed by filtration through Chamberlain filters. The extract was treated as if sterile, sealed and kept at 0° C. The approximate concentration of the vitamin B₁ in the extract was about 2 micrograms per gram of extract (2γ).

From a large number of small Tomato plants of the variety 'Radio' a uniform selection was made in April of vigorous plants. These were transferred to 5-inch pots containing a medium loam with sufficient readily soluble phosphates likely to ensure root development. 50 ccs. of 1 per cent. calcium nitrate was watered on to the pots a week after transference so that vigorous young plants capable of rapid growth were soon available for test purposes.

(a) Injections.

(1) The first tests were made on plants 8 inches high bearing four mature and a fifth small leaf. The extract was injected into the stems

above the second node from the apical bud. A calibrated hypodermic syringe was used in conjunction with a technique ensuring sterile conditions. The plants received 0.25 ccs. of the 1:10 extract, or about 0.5 γ vitamin B₁. Ten control plants were injected with distilled water. No response, visible in 24 or 48 hours, was noticed such as would have been obtained by the injection of a solution of active growth substances. No marked epinasty, followed by stem distortion or proliferation, was seen.

(2) A week later a further series of ten plants received three injections each of 0.25 ccs. given on three successive days, a total of 1.5 γ vitamin B₁. There were observed but feeble, transient, and uncertain signs of leaf dropping of about six hours' duration. This was not followed by the usual symptoms of the application of growth substances. The actual pricking of treated and control series slightly delayed the development of the young leaves when comparison was made with untouched plants, but recovery was rapid, and by May 27, when the first flowers showed the colour of the petals between the sepals, these treated and control series and other plants bore a close resemblance to each other in every way. Statistical analysis of the data collected, including heights, number of flower buds, length of leaves, width of leaves, and number of leaves, failed to reveal any significant difference between the series three weeks after treatment, thus no significant difference could be attributed to the extract.

(b) *Application to the Soil.*

Further tests were made by applying the yeast extract to the soil in the pots.

(1) A preliminary small test was made with six plants; 15 ccs. of the extract previously diluted to 1:100 was applied on May 20. To the soil was added 3 γ of vitamin B₁ in solution. Two further applications were made at intervals of twenty days. The soil received 9 micrograms of vitamin B₁. No effect was noticed.

(2) A further test was made using 30 plants treated when the first fruit was 1 cm. diameter. 10 ccs. of the diluted (1/100) extract was applied to the soil in each pot, or 2 micrograms of vitamin B₁. No effect was observed.

Cultural details included transference to larger pots, support given to the stems, removal of side shoots (no 'stopping' of terminal growth), the addition of a complete culture solution with traces of boron, the addition of adequate potash in late July to assist ripening. The ripe fruits were periodically picked and weighed for each plant separately. At the end of the season the total weights of treated and control plants were compared. There was no significant difference between the series. The six plants repeatedly treated gave a yield of 102 per cent. of the controls. The 30 treated plants gave a yield of 97 per cent. of the controls. The injected plants gave a yield of 94 per cent. of their controls. Neither was there any significant difference in rate of ripening fruit.

Through the co-operation of Dr. MAGNUS PYKE and the courtesy of Messrs. Vitamins Ltd., determinations were made in their research laboratories of the vitamin B₁ content of samples of the fruits from treated and control plants. The fruits were selected by size, position on plant, and colour and degree of ripeness, and the comparison should be made between No. 1 of treated with No. 1 control sample, and so on. Dr. PYKE's data were:—

Vitamin B₁ i.u. in 100 gms.

(a. 2) September 15			(b. 1) September 24.		
No.	Control.	Treated.	No.	Control.	Treated.
1	8	11	1	21	9
2	5	15	2	17	17
3	17	13	3	13	21
4	6	8	4	19	13
5	8	9	5	11	13
			6	15	9

It cannot be stated that the fruits from treated plants contained a higher content of vitamin B₁.

Thus the Tomato plant if supplied with the usual nutrients can make sufficient B₁ for its own purposes and neither injection nor application to the soil of vitamin B₁ increased the vitamin content of the fruit. The small Wisley experiments, therefore, gave negative results. They agree with other recent findings and should help to prevent the waste of compounds that can be used to better purpose in direct human nutrition.

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HITCHCOCK, A. E., and ZIMMERMAN, P. W. (1941): "Further tests with vitamin B₁ on established plants and seedlings." *Contrib. Boyce-Thompson Institute*, 12, 143-156.

TEMPLEMAN, W. G., and POLLARD, N. (1941): "Effect of vitamin B₁ and nicotinic acid on growth of spring Oats and Tomatos in sand culture." *Ann. Bot.*, 5, 1941, 133-147.

ZIMMERMAN, P. W. (1941): "The present status of vitamin B₁." *Amer. Rose Annual*, 26, 87-94.

PRESERVING BEANS IN SALT.

GREEN vegetables are so welcome during the winter nowadays that many people would like to preserve green Beans, but some may be hesitating as a certain number of failures were reported last year. Failure to keep the Beans in good condition is caused by too small an amount of salt being added in the first place. Tough salt Beans after cooking are caused by too long soaking in cold water.

The method which has proved successful is as follows. Either French or Runner Beans are suitable for this treatment, but they should be young and fresh; the last Beans on the plants, already beginning to toughen, are not worth preserving. It is not necessary to fill the receptacles all at once, so that a fresh supply can be added whenever there are young Beans available.

For every 3-4 lbs. of Beans 1 lb. of kitchen salt is required. If small, the Beans can be left whole; if large, they are better sliced and the "strings" removed. They should be washed and dried, prepared as may be necessary and then packed in stoneware or glass jars; first a layer of salt, then a layer of Beans, then more salt and more Beans in the proportions given above until the jar is full. Even if pressed well down at the time, as they should be, the contents shrink a little, and more Beans can be added in a few days; the salt

becomes moist, forming a strong brine. Whenever additional Beans are put in, the appropriate amount of extra salt should accompany them. When full the jars should be sealed.

When the Beans are to be used, the required quantity should be removed from the jar and washed in *warm*, not cold, water. They may be soaked in warm water for two hours, but not longer or they become hard. In fact, some people prefer not to soak them at all but to wash them in hot water, put into a pan of hot water and bring to the boil, throw away the first water and replace it by a second supply of hot water, which should also boil, when the Beans will be cooked in about ten minutes. If washed and soaked for two hours, as usually recommended, the Beans take 30–35 minutes to become tender. No salt need be added to the water used for cooking the Beans.

THE AWARD OF GARDEN MERIT.—LXVII.

303. BUDDLEIA DAVIDII.

Award of Garden Merit, September 15, 1941.

Buddleia Davidii is the older and correct name for a plant which attained its popularity as *B. variabilis*. It is a deciduous shrub which varies considerably in habit, being sometimes as much as 15 feet high and in the dwarf form introduced by FARRER, var. *nanhoensis*, rarely exceeding 3–4 feet. It is a native of Central and Western China, growing at 9000 feet and was discovered in 1887 by AUGUSTINE HENRY. The form first introduced through St. Petersburg flowers early but is of straggling habit with pale flowers. M. DE VILMORIN, in 1893, raised from seed the variety now known as *Veitchiana*; this was later introduced by E. H. WILSON and is a much better form for garden use as the flowers are deeper in colour, in closer trusses on arching branches that display them well. There are now a number of other varietal forms.

Buddleia Davidii grows equally well in town or country, in gardens large or small; it likes a good loamy soil and should be heavily pruned each year—if left untouched the size of the flower trusses dwindles and the branches become crowded; but if it is cut hard back almost to the old wood each February it will throw up shoots as much as 8 feet long ending in splendid trusses from July to September. Together with *Sedum spectabile*, *Buddleia Davidii* is very popular with butterflies, which visit the flowers in large numbers.

Seed is freely produced, in fact self-sown seedlings may be found at quite a distance from the plant as they are wind-borne; seedlings may show variation but propagation is easy by cuttings of late summer growths.

304. HYDRANGEA. OPULOIDES VAR. MARIESII.

Award of Garden Merit, April 11, 1938.

The common Hydrangea is a well-known plant both for greenhouse cultivation and, in favoured places, out of doors, and is a native of China. The fact that the flowers may be blue or pink according to the nature of the soil in which it is grown is known to most people; the name of this shrub is not so definite. BEAN gives it as *Hydrangea hortensis*, the *Kew Handlist of Trees and Shrubs* gives *Hydrangea*

opuloides and the most recent dictum of REHDER is *Hydrangea macrophylla*. With a view to stabilizing garden names as far as may be, gardeners are recommended to adhere to the nomenclature given in the *Kew Handlist*, so that *Hydrangea opuloides* would be horticulturally correct. The name *H. hortensis* is still used, but this has had a chequered career, being variously spelled *hortensis*, indicating a cultivated form, and *Hortensia*, in honour, some say of Queen HORTENSE, daughter of the Empress JOSEPHINE, others of Madame HORTENSE LEPANTE, the wife of a friend of LAMARCK'S.

The wild *Hydrangeas* have flower-heads consisting of inconspicuous fertile flowers in the centre, sometimes surrounded by showy coloured sterile ones; in cultivated forms the sterile flowers tend to be more numerous, thus making the corymb more conspicuous and beautiful. In *Hydrangea opuloides* all, or nearly all, the flowers are sterile and of fair size, making a showy, rounded head; in the var. *Mariesii* to which the Award has been given the marginal flowers alone are sterile, but these may be very large, up to 3 inches across, and mauve-pink in colour; in habit and constitution it otherwise resembles the type; it was introduced from Japan in 1879.

305. KNIPHOFIA UVARIA VAR. NOBILIS.

Award of Garden Merit, May 8, 1933.

306. KNIPHOFIA RUFA.

Award of Garden Merit, May 8, 1933.

The Red Hot Poker has been familiar in parks and gardens for very many years, having been introduced from the Cape in 1707; it is a decorative plant, but its stiff 3-foot long leaves and massive spike rising sometimes to 6 feet demand plenty of space for it to be seen to advantage. Earlier known as *Tritoma alooides*, the correct botanical name is *Kniphofia Uvaria*; there are a number of varieties of which *nobilis* is one of the handsomest; the close-set scarlet flowers fade to a bright orange.

Many people who admire Red Hot Pokers have not adequate accommodation for such large plants as *K. Uvaria*, but more recently a number of smaller species have been introduced; one of the best of these is *K. rufa* from Natal, which was received at Kew in 1897; the top buds of the flowering spike are red but the open flowers are yellow and the whole inflorescence hardly exceeds 2 feet with foot-long leaves in proportion.

These *Kniphofias* are generally regarded as hardy and will grow in any good light soil, but it is a wise precaution to cover them with litter in very severe weather. They can be raised from seed when this is obtainable, or are easily propagated by division. *Kniphofia rufa* is figured in the *Botanical Magazine* t. 7706.

307. ANCHUSA CAPENSIS 'BLUEBIRD.'

Award of Garden Merit, September 10, 1934.

308. ANCHUSA ITALICA.

Award of Garden Merit, June 7, 1937.

Anchusas are useful in the garden for the bright blue flowers which are usually thought of as characteristic of the genus, though there are

also white, violet-blue and even yellow species, of less horticultural value. *Anchusa capensis* from South Africa is a biennial growing about 1½ foot high with small flowers in leafy scorpioid cymes. It is usually treated as an annual since it will flower in eight weeks from seed; excellent results may be obtained by sowing in late summer, though some protection may be necessary to bring the plants through the winter. 'Blue Bird' is a variety with deep indigo-blue flowers and a compact habit at flowering time.

Anchusa italica (whose correct name is *A. azurea*) is a taller growing perennial which will continue to flower for a long period if not allowed to seed; the basal leaves are large and the flowering stems may be as much as 5 feet high; the Forget-me-not-like flowers are as much as ¾ inch across, and brilliantly blue; the variety known as 'Dropmore' is one of the finest. This *Anchusa* should be propagated by division as it does not come true from seed.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1942.

***Berberis calliantha*.** A.M. May 19, 1942. A useful species for the front of the shrub border or for the larger rock-garden, where it forms a dense bush 3 feet high and as much through. It is chiefly notable for its unusually large flowers, which are an inch across, lemon-yellow, and carried on long red pedicels. The leathery, evergreen, spine-toothed leaves are waxy-white beneath. This species was collected by Captain Kingdon Ward (No. 6308) in the Tsangpo Gorge (S.E. Tibet) in 1924. Exhibited by the Director, Royal Botanic Gardens, Kew. See p. xl.

***Celsia acaulis*.** A.M. April 14, 1942, as a flowering plant for the alpine house. This plant has a rosette of crinkled green leaves, not unlike a *Ramondia*, from the centre of which arise a number of brilliant yellow *Verbascum*-like flowers, each on a short stalk; the attractiveness of the display is enhanced by the orange colour of the unopened buds. It appears to be perennial as the specimen shown was flowering for the second year. Shown by Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough. See p. xxxix and Fig. 90.

***Cymbidium* × 'Galaxy,' Sutherlands var.** A.M. April 14, 1942. This is a promising hybrid, obtained by crossing *C.* × 'Goldfinch' with *C.* × *Alexanderi*. The flowers have broadly formed segments, which are ivory-white, the margin of the labellum suffused with pink. Exhibited by Col. E. M. Perry, C.B.E., Sutherlands, Wimbledon. See p. xxxvii.

***Cymbidium* × 'Riga' var. 'Noblllor.'** A.M. April 14, 1942. The spike bore 10 flowers of light reddish-bronze colour, with darker venation, the labellum yellowish with a crimson margin. Raised and exhibited by Messrs. J. & A. McBean, Cooksbridge. The parents are *C.* × 'Swallow' and *C.* × 'Pearl.' See p. xxxvii.

***Dendrobium* × 'Montrose,'** A.M. April 14, 1942. This well cultivated plant bore a total of 144 attractive flowers, of light buff-yellow colour, the central area of the labellum maroon colour. It results from the crossing of *D.* × *Ainsworthii* with *D.* × *Thwaitesiae*. Exhibited by J. V. Rank, Esq., Ouborough, Godstone, Surrey. See p. xxxvii.

***Laeliocattleya* × 'Winter Belle.'** A.M. April 14, 1942. This pleasing hybrid between *Lc.* 'Bella' and *C.* 'Titrianae' bore a spike

of 5 large flowers, of mauve colour, the expansive labellum crimson-purple with old gold colour in the throat area. Exhibited by the Stuart Low Co., Jarvis Brook, Sussex. See p. xxxvii.

Lonicera Griffithii. A.M. April 14, 1942. A very beautiful Honeysuckle with grey-green foliage and flowers of phlox pink (H.C.C. 625/3) darkening as they fade to solferino purple (H.C.C. 26/1). In mild localities this should succeed out of doors, but it is generally more suitable for the cool greenhouse. An illustrated note on this species was published in the JOURNAL, 66, p. 369. Exhibited by the Director, R.H.S. Gardens, Wisley. See p. xxxvii.

Magnolia Kobus. A.M. April 14, 1942. A hardy, fast-growing and free-flowering Japanese species, with white flowers having 6 spreading, oblanceolate petals 2 to 3 inches long. It forms a deciduous tree up to 30 feet high, which, when in full flower, is an object of great beauty. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. See p. xxxvii.

Magnolia Sprengeri. A.M. April 14, 1942. A handsome deciduous tree introduced from Western China by E. H. Wilson in 1904. The cup-shaped flowers have from 8 to 12 creamy-white spathulate petals nearly 4 inches long in whorls of four, the outer ones rayed externally with fuchsine purple (H.C.C. 627/3). Exhibited by Lord Aberconway. See p. xxxvii.

Miltonia × 'April.' A.M. April 14, 1942. Although only a small plant, the spike bore two large and well-developed flowers, in colour rich ruby-crimson, the labellum with a yellow crest surrounded by a rose-coloured zone. The result of crossing *M.* × 'Robert Paterson' with *M.* × 'Mrs. J. B. Crum.' Raised and exhibited by Messrs. Black & Florry, Slough. See p. xxxvii.

Narcissus 'Buncrana.' A.M. April 14, 1942, as a variety for exhibition. An Incomparabilis variety (Division 2b) with a flower just over 1½ inch in diameter, well poised on an 18-inch stem. The white segments were smooth and broad, the outer ones being nearly 1½ inch long and about 1½ inch wide. The neat corona was 1½ inch long, about 1½ inch in diameter at its frilled mouth, and Nasturtium-orange, passing to yellow at the base. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. xxxviii.

Narcissus 'Cotopaxi.' A.M. April 14, 1942, as a variety for exhibition. An attractive Incomparabilis variety (Division 2a) with a flower just over 4 inches in diameter, borne on a strong 20-inch stem. The deep Mimosa-yellow perianth segments were smooth and overlapping, the outer ones being about 1½ inch in length and width. The Mari-gold-orange corona was bowl shaped, ¾ inch long and about 1½ inch in diameter. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. xxxviii.

Narcissus 'Galway.' A.M. April 14, 1942, as a variety for exhibition. A fine variety of great substance, provisionally classified as an Incomparabilis (Division 2a), exhibited under the name 'Donegal' to which an earlier variety had prior claim. It had a flower 4½ inches in diameter, well poised on a stout 20-inch stem. The deep aureolin segments were broad, smooth and overlapping, the outer ones being 1½ inch long and about as broad. The deep lemon-yellow corona was about 1½ inch long and about 2 inches in diameter at its frilled and reflexed margin. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. xxxviii.

Narcissus 'Kingscourt.' A.M. April 14, 1942, as a variety for

exhibition. A refined yellow Trumpet variety (Division 1a) with a flower nearly $4\frac{1}{2}$ inches in diameter, well poised on a 16-inch stem. The deep aureolin perianth segments were rounded, smooth, overlapping, and at least in young flowers, with a slightly forward pose. The outer segments were $1\frac{7}{8}$ inch long and about as broad. The corona was deep lemon-yellow, about $1\frac{1}{4}$ inch long and about $1\frac{3}{4}$ inch in diameter at its expanded and frilled mouth. This variety, which received Preliminary Commendation on April 17, 1941, was raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. xxxviii.

Narcissus 'Narvik.' A.M. April 14, 1942, as a variety for exhibition. A brilliantly coloured, well-formed, clear-cut Incomparabilis variety (Division 2a) with a flower about $3\frac{3}{4}$ inches in diameter, borne on a 20-inch stem. The bright canary-yellow perianth segments were overlapping, smooth and flat, the outer ones being $1\frac{1}{8}$ inch long and nearly as broad. The cup-shaped, deep orange corona was about $\frac{7}{8}$ inch long and $1\frac{1}{2}$ inch in diameter at its crimped margin. This variety, which received Preliminary Commendation on April 16, 1940, was raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. xxxviii.

Narcissus 'Shannon.' A.M. April 14, 1942, as a variety for exhibition. A white Leedsii variety (Division 4a) with a flower about $4\frac{1}{2}$ inches in diameter, borne on a stout 18-inch stem. The segments were smooth and overlapping, the outer ones being just over $1\frac{3}{4}$ inch long and about $1\frac{1}{2}$ inch broad. The neat corona was $1\frac{1}{2}$ inch long and about $1\frac{1}{2}$ inch in diameter at its frilled and slightly expanded mouth. Raised and shown by Mr. J. L. Richardson, Prospect House, Waterford. See p. xxxviii.

Paeonia suffruticosa var. 'Haku-unryo.' A.M. May 19, 1942. The large, fragrant, semi-double flowers of this beautiful Tree Paeony have obovate petals up to 6 inches long, white flushed with rose at the base, slightly and irregularly toothed at their margins. The leaf is pinnate with broadly lobed, bronze-tinted leaflets and reddish stalk. Exhibited by Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. See p. xl.

Rhododendron × chrysaspis. A.M. April 14, 1942, as a hardy flowering plant suitable for the rock garden. This is a hybrid between *R. chrysodoron* and *R. leucaspis*; in form and in the dark coloured anthers it strongly resembles *leucaspis*, but the colour of the petals is pale sulphur-yellow (H.C.C. 1/3). Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. xxxviii and Fig. 87.

Rhododendron × 'Circé.' A.M. April 14, 1942, as a hardy flowering plant suitable for the rock garden. This plant is a cross between *R. × 'May Day'* and *R. × 'Elizabeth'*; it is low growing with shining green leaves, the underside covered with pale brown tomentum when young. The flowers, five or more in each truss, are deep trumpet shaped, $2\frac{1}{2}$ inches across at the mouth, and bright red in colour (H.C.C. 820/1). Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. xxxviii.

Rhododendron pentaphyllum. A.M. April 14, 1942, as an early flowering, hardy plant. This is the earliest Azalea to flower, the blossom opening well before the leaves. The flowers, shallow cups, about $2\frac{1}{2}$ inches across, are warm pink becoming paler with age (H.C.C. 25/2 to 25/3). Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. xxxviii.

Syringa 'Maureen.' A.M. May 19, 1942. A very fine Lilac raised by Miss Preston at Ottawa. The individual flower is nearly an inch across, flat, with orbicular-ovate petals of Pansy violet (H.C.C. 033/1-033/3), developing from a purplish-red bud. The panicles are long and well formed. Exhibited by the Rt. Hon. the Earl of Bessborough, Stansted Park, Rowland Castle, Hants. See p. xl. and Fig. 89.

NEW RHODODENDRON HYBRIDS.

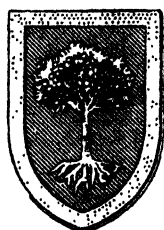
OWING to the cessation of the publication of the *Rhododendron Association's Year Book* for the duration of the War, the following list of hybrids recorded during 1941 is published for information and registration.

NAME.	PARENTAGE.	RAISER OR EXHIBITOR.
ADONIS . . .	Vanessa × Sunrise . . .	ABERCONWAY
ADRASTIA . . .	Williamsianum × neriiflorum . . .	ABERCONWAY
ALCIBIADES . . .	Hiraethlyn × F. C. Puddle . . .	ABERCONWAY
ALESIA . . .	Portia × Meddianum . . .	ABERCONWAY
AMATA . . .	Adrastia × F. C. Puddle . . .	ABERCONWAY
ANITA . . .	campylocarpum × Griersonianum . . .	ABERCONWAY
APHRODITE . . .	Phidias × Cowslip . . .	ABERCONWAY
ARTUS . . .	Amaura × Fabia . . .	ABERCONWAY
ASPANSIA . . .	Astarte × haematodes . . .	ABERCONWAY
ASTA . . .	repens × chaetomallum . . .	ABERCONWAY
BELLONA . . .	Cardinal × Griersonianum . . .	ABERCONWAY
BIANCA . . .	herpesticum × campylocarpum . . .	ABERCONWAY
CAROLA . . .	Ouida × Williamsianum . . .	ABERCONWAY
CHARM . . .	repens × Shilsonii . . .	ABERCONWAY
CYCLOPS . . .	F. C. Puddle × Nerihaem . . .	ABERCONWAY
DACIA . . .	scyphocalyx × F. C. Puddle . . .	ABERCONWAY
DAINTY . . .	May Day × Elisabeth . . .	ABERCONWAY
ELSIE PHIPPS . . .	Souliei × Penjerrick . . .	ABERCONWAY
EVENTIDE . . .	Sunrise × Griersonianum . . .	ABERCONWAY
FASCINATOR . . .	repens × Hiraethlyn . . .	ABERCONWAY
FELICITY . . .	Radiance × F. C. Puddle . . .	ABERCONWAY
FLAMINGO . . .	Loder's White × Griersonianum . . .	HORLICK
GLADIATOR . . .	F. C. Puddle × Griersonianum . . .	ABERCONWAY
GRIERCALYX . . .	Griersonianum × megacalyx . . .	—
GROSCLAUDE . . .	haematodes × eriogynum . . .	ROTHSCHILD
HECLA . . .	Thomsonii × Griersonianum . . .	ABERCONWAY
HERA . . .	haematodes × Jock . . .	ABERCONWAY
HIAWATHA . . .	Adrastia × Griersonianum . . .	ABERCONWAY
HYPERION . . .	repens × Cardinal . . .	ABERCONWAY
IAGO . . .	Romany Chai × Lady Bessborough . . .	ROTHSCHILD
IBEX . . .	Griersonianum × pocophorum . . .	ROTHSCHILD
IBIS . . .	Adelaide × Griersonianum . . .	ROTHSCHILD
ICARUS . . .	A. Gilbert × herpesticum . . .	ROTHSCHILD
ICENIA . . .	Moser's Maroon × Lady Bessborough . . .	ROTHSCHILD
IDAHO . . .	Dolly × Elliottii . . .	ROTHSCHILD
IDEALIST . . .	Wardii × Naomi . . .	ROTHSCHILD
ILIAD . . .	Nereid × Kyawi . . .	ROTHSCHILD
ILYRIA . . .	Romany Chai × Kyawi . . .	ROTHSCHILD
ILONA . . .	Valentinianum × auritum . . .	ROTHSCHILD
IMPI . . .	didymum × Moser's Maroon . . .	ROTHSCHILD
INAMORATA . . .	Wardii × discolor . . .	ROTHSCHILD
INCHMERY . . .	Don X × eriogynum . . .	ROTHSCHILD
INDIANA . . .	scyphocalyx × Kyawi . . .	ROTHSCHILD

NAME.	PARENTAGE.	RAISER OR EXHIBITOR.
INCOMITABLE . . .	Souliei × General Sir John Ducane . . .	ROTHSCHILD
INFANTA . . .	Isabella × Griersonianum . . .	INGRAM
INGRID . . .	Tally Ho × Griffithianum . . .	ROTHSCHILD
INTREPID . . .	Beau Brummell × Kyawi . . .	ROTHSCHILD
IOLA . . .	Valentinianum × bullatum . . .	ROTHSCHILD
IOLANTHE . . .	Blanc-mange × Kyawi . . .	ROTHSCHILD
IRONSIDE . . .	Midsummer × Kyawi . . .	ROTHSCHILD
ISIS . . .	Carex × laxiflorum . . .	ROTHSCHILD
ISME . . .	Wardii × venator . . .	ROTHSCHILD
ISPAHAN . . .	Fabia × Wardii . . .	ROTHSCHILD
ISLAY . . .	agapetum × Romany Chai . . .	ROTHSCHILD
ISTANBUL . . .	Mrs. H. Stocker × Elliottii . . .	ROTHSCHILD
ISTAR . . .	dichroanthum × Naomi . . .	ROTHSCHILD
ITHICA . . .	scyphocalyx var. septentrionale × eriogynum . . .	ROTHSCHILD
IVAN . . .	B. de Bruin × Kyawi . . .	ROTHSCHILD
IVANHOE . . .	Chanticleer × Griersonianum . . .	ROTHSCHILD
IVIZA . . .	Fabia × Bustard . . .	ROTHSCHILD
JUNO . . .	Amaura × F. C. Puddle . . .	ABERCONWAY
JUPITER . . .	Fabia × Arthur Osborn . . .	ABERCONWAY
LAURA ABERCON- WAY . . .	Griersonianum × Barclayi . . .	ABERCONWAY
LUSTRE . . .	Dante × Griersonianum . . .	ABERCONWAY
MARILOO . . .	Dr. Stocker × lacteum . . .	ROTHSCHILD
MENIPPE . . .	Erebus × Loderi . . .	ABERCONWAY
METEOR . . .	Eros × haematodes . . .	ABERCONWAY
METIS . . .	herpesticum × Griersonianum . . .	ABERCONWAY
MURIEL HOLMAN . . .	Griercalyx × Maddenii . . .	TREMANNE
NEPTUNE . . .	Eudora × Loderi . . .	ABERCONWAY
OEDIPUS . . .	Eros × Jaquetta . . .	ABERCONWAY
ORESTES . . .	Shilsonian × Griersonianum . . .	ABERCONWAY
ORTIGA . . .	Euryalus × Sunrise . . .	ABERCONWAY
OTHELLO . . .	Arthur Osborn × eriogynum . . .	ABERCONWAY
PANDORA . . .	Fabia × eriogynum . . .	ABERCONWAY
PERSEPHONE . . .	repens × floccigerum . . .	ABERCONWAY
PERSEUS . . .	Vanessa × Jaquetta . . .	ABERCONWAY
PHOEBUS . . .	F. C. Puddle × haematodes . . .	ABERCONWAY
PIXIE . . .	repens × apodectum . . .	ABERCONWAY
RAMILLIES . . .	Ethel × Redwing . . .	ABERCONWAY
RIMA . . .	croceum × decorum . . .	STEVENSON
ROMAREZ . . .	Kyawi × Griersonianum . . .	STEVENSON
RUFUS . . .	repens × sanguineum . . .	ABERCONWAY
SALUS . . .	Arthur Osborn × Coreta . . .	ABERCONWAY
SATAN'S BREATH . . .	delelense × sulfureum . . .	INGRAM
SATYR . . .	Choremia × strigillosum . . .	ABERCONWAY
SELEN . . .	Choremia × Griersonianum . . .	ABERCONWAY
SOLO . . .	Astarte × Sunrise . . .	ABERCONWAY
SUSIE . . .	Souliei × Griersonianum . . .	STIRLING-MAXWELL
SYMPHONY . . .	Arthur Osborn × F. C. Puddle . . .	ABERCONWAY
THAIS . . .	Euryalus × Loderi . . .	ABERCONWAY
THALIA . . .	Vanessa × eriogynum . . .	ABERCONWAY
THOMDETTON . . .	Thomsonii × detonsum . . .	MAGOR
TORREADOR . . .	Arthur Osborn × Griersonianum . . .	ABERCONWAY
VALDA . . .	Latona × haematodes . . .	ABERCONWAY
VEGA . . .	Fabia × haematodes . . .	ABERCONWAY
VIVID . . .	Humming Bird × F. C. Puddle . . .	ABERCONWAY
W. F. H. . . .	haematodes × Tally Ho . . .	WHITAKER
YOLANDE . . .	scyphocalyx × Eudora . . .	ABERCONWAY
ZAMPA . . .	Daphne × F. C. Puddle . . .	ABERCONWAY
ZENOBIA . . .	Eros × Arthur Osborn . . .	ABERCONWAY

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXVII



Part 9

September 1942

THE SECRETARY'S PAGE.

Subscriptions.—Fellows and Associates are reminded that if they have any friends desiring to join the Society now, a full year's subscription paid on October 1 entitles them to all the privileges of Fellowship until January 1, 1944.

Monthly Show.—A monthly show will be held on September 15 (12 noon to 6 P.M.) and 16 (10 A.M. to 5 P.M.) which will include exhibits from the National Dahlia and National Chrysanthemum Societies. The show to be held on October 6 and 7 will include the R.H.S. Fruit and Vegetable Show and schedules may be obtained on application to the Secretary.

Demonstrations at Wisley.—On September 16 and 17 from 2 to 4 P.M. there will be a demonstration on Harvesting and Storing, and on October 7 and 8, also from 2 to 4 P.M., on Digging, Trenching, Manuring and Composting; both demonstrations will take place in the Vegetable Garden. Will Fellows and their friends who intend to be present kindly inform the Director of the Gardens so that arrangements may be made.

Rose Show.—The National Rose Society will be holding a show in the Society's Old Hall on September 18, from 12 noon to 6 P.M. Fellows' tickets admit free.

Fruit for Naming.—At this time of the year many Fellows and Associates desire to have fruit named, and it would be a great convenience if the following rules for sending fruits for identification were followed:

Send at least three perfect specimens of a variety. Do not send until the fruits are mature and then choose specimens representative of the particular variety. Avoid sending bruised, diseased or abnormal fruits. Include with each variety a typical shoot with foliage. Number each variety, preferably in Roman figures, by marking the skin with a hard pencil, and keep a record of the tree from which it is gathered. Labels are often displaced during transit. Wrap each fruit in paper

and pack it carefully and securely in wood-wool or similar material. Flimsy cardboard boxes are usually crushed in the post, while scented-soap boxes taint the fruit and obscure the characteristic flavour. Give all the information you can respecting the age of the trees and how they are grown, e.g. indoors, or out, as cordons, bushes, or standards, etc.

It is a convenience if specimens are sent so as to reach the office by the first post on the Monday preceding a Monthly Show.

The Society's Examinations.—The Examinations in 1943 will be held, circumstances permitting, on the following dates :

Written.

General (Senior and Junior)—Thursday, March 18. Entries close Monday, January 11, 1943.

Teachers' (Preliminary and Advanced)—Saturday, March 27. Entries close Wednesday, December 16, 1942.

N.D.H. (Preliminary and Final)—Saturday, April 17. Entries close Saturday, January 23, 1943.

Practical.

Teachers' (Advanced)—Thursday and Friday, May 27 and 28.

N.D.H. (Preliminary)—Monday–Friday, May 31 to June 4.

N.D.H. (Final, Sect. I)—Monday–Thursday, June 7 to 10.

Syllabuses and Entry Forms may be obtained on application to The Secretary, Royal Horticultural Society, Vincent Square, London, S.W. 1.

R.H.S. Gardeners' Diary, 1943.—It is possible that the R.H.S. Gardeners' Diary for 1943 will be obtainable in October. Last year, it is feared, many of the Fellows went without a copy as it was very quickly sold out. The Secretary is prepared to book orders for the Diary now. The selling price, including Purchase Tax, is as follows :—

In Pluviusin with back loop and pencil, 3s. 4d. post free.

In Morocco leather with pencil (not refillable), 6s. 1d. post free.

In refillable Crocodile Case with card and stamp pockets, 11s. 1d. post free.

Refills for Crocodile Case, 2s. 4d. post free.

WISLEY IN SEPTEMBER.

WITH the approach of autumn there comes a change in the character of the floral attractions of the Gardens, and the comparative paucity of species which delight the lovers of alpine plants and flowering shrubs is supplemented by the collections of numerous horticultural varieties of such indispensable late-flowering genera as Dahlia, Aster and Chrysanthemum. These collections provide at all times a more reliable guide in the selection of varieties than catalogues or flower shows can ; and their interest is not entirely dependent upon new introductions, for they include old varieties of value. For example, in the Dahlia collection will be found such varieties as 'Clematis,' 'The Bishop of Llandaff' and others less well known, which, while they can lay no claim to novelty, have the greater merit of individuality. Among the newer kinds are 'Helly Boudewyn,' of perfect form and perhaps the finest white yet raised ; the fine, upstanding, scarlet

'Barbarossa,' and 'Fortune' of cream-shaded, salmon-pink. The hardy border Chrysanthemums offer considerable variety in colour, size of flower and habit, characters which show marked improvement in the more recent additions; and the collection includes varieties which are satisfactory if allowed to flower in the spray, e.g. 'Snowfall,' as well as those which are improved by disbudding, e.g. 'Coppelia.' In the same part of the Gardens many varieties of Montbretia produce their dainty red, orange or yellow blossoms for several weeks.

In the Azalea Garden and at the entrance to the Pinetum there are large plantings of the best hybrid Colchicums whose rosy and purple hues harmonize agreeably with the autumnal colouring of nearby shrubs. In Seven Acres the colour of foliage and berry daily becomes brighter. The leaves of *Ribes aureum* and *R. americanum*, *Acer circinatum*, *Prunus Sargentii* and *Berberis virescens* are prettily tinted; *Malus baccata*, *M. Sargentii*, *Hippophaë rhamnoides* and *Euonymus yedoensis* compete with species of *Berberis* and *Cotoneaster* in the production of gaily coloured fruits. The Heath Garden is still colourful with forms of *Calluna vulgaris* such as the rich red *Alportii* and the double pink 'H. E. Beale,' *Erica vagans* 'D. F. Maxwell' and 'St. Keverne,' and the distinct and dainty variety of *E. cinerea* called 'Eden Valley.'

Close by, the subdued light of the Wild Garden is brightened here and there by the scarlet autumn garb of *Enkianthus perulatus* and the less vivid tones of *Vaccinium virgatum*, beneath which arch the blue or white wands of the Willow Gentian, *G. asclepiadea*, soon to be surpassed in purity of colour by drifts of *G. sino-ornata*. *Cyrilla racemiflora*, an uncommon woodland shrub from the eastern U.S.A., is now decorated with pendent white sprays, and the long-stemmed, creamy panicles of *Hydrangea paniculata* var. *grandiflora* are conspicuous. Other shrubs whose late-flowering character makes them particularly useful are *Clerodendron Bungei* (*foetidum*) with large, pink flower-heads supported by dark green, purple-flushed foliage and *Tecoma grandiflora* with brick-red, trumpet-shaped flowers rather susceptible to damage by early autumn frosts, both growing against the west wall of the Laboratory; lavender-flowered *Perowskia atriplicifolia* with fine grey foliage, to be seen effectively associated with Heliotrope near the main gate (see Fig. 99); *Buddleia Fallowiana* with silvery leaves and pale, grey-blue flowers, and *B. × Weyeriana*, a curious hybrid intermediate in colour and shape of inflorescence between its parents *B. Davidii* and *B. globosa*, the last two both to be found in Seven Acres.

Among the late-flowering plants in the Rock Garden the prostrate *Polygonum vacciniifolium* and *P. affine* cover deservedly prominent sites with their neat foliage and pink spikes. A very desirable and less common species, *P. Reynoutria*, is a bushy plant eighteen inches high whose insignificant flowers are followed by pretty crimson fruiting sprays. *Gentiana sino-ornata* and its hybrid *G. × Macaulayi* never fail, the former flowering profusely for many weeks, but *G. Farreri* is less amenable at Wisley. *Verbena chamaedryfolia* and *Zauschneria californica* are still forming vivid splashes of colour, and towards the end of the month the long Crocus season is opened by the slender violet *C. nudiflorus*, lilac, orange-throated *C. zonatus* and the delicately pencilled forms of *C. speciosus*. In the Alpine house one may still expect to find a few late Campanulas such as *C. cashmeriana* and *C. Tymonsii*, *Sedum Chaneitii* from Kansu and the Japanese *S. cauti-cola*. The pale green mat of *Nertera depressa*, covered with orange

berries, always wins approval, as do the rosy *Limonium ornatum* and white-flowered *Gentiana saxosa*.

There is still much of interest to be seen in the Vegetable Trial Ground, of which the more important features were listed in the August notes. The collection of Tomatos promises an abundant harvest and should prove instructive to all who are growing them in the open. Visitors will have an opportunity to compare the respective yields of the many varieties of Onion now approaching maturity, and will probably discover some novelties among the collections of Chard (Spinach Beet), Cucumbers, Squashes and Sweet Corn.

THE WAR-TIME KITCHEN GARDEN.

SEPTEMBER.

Storing Vegetables.—Equally as important as the fresh vegetables that can be produced in the garden are the crops that can be stored for winter use when little or nothing is available from the open ground. Roots are not inanimate objects even when dug up ; if they are placed in a warm, moist atmosphere they will begin to produce new growths, thus using up the material in the root itself ; if in a cold, damp place they are very liable to be attacked by fungoid diseases ; if in a warm, dry place water may be evaporated off so that they become flabby. In fact, a nice adjustment of circumstances is required to bring stored vegetables through the winter months in a usable condition until the supply is finished, and with no serious losses.

Roots intended for storing should be very carefully dug so that the outer skin is not damaged, as even a small wound will make them more susceptible to fungus diseases.

Onions and Shallots need drying, and this is best done, when the weather permits, by leaving them lying on the soil for several days. The leaves of the Onions should not be cut off while still green, nor should the bulbs be put into permanent store until the leaves are quite dry. The best method of storing is to tie in ropes which can be hung in a dry frost-proof shed ; neither Onions nor Shallots mind a relatively low temperature, nor if they are in the light or in the dark.

Carrots and Turnips do not want drying, but the green leaves should be removed carefully with a knife about one inch from the top of the root. They will lose moisture in a dry atmosphere so should be stored in sand, peat or other suitable material, in boxes or in heaps.

Beetroots should be dug with special care to prevent damaging the skin and any soil adhering lightly knocked off with the hand ; it is better to twist the leaves off well above the shoulders of the root. They can be stored in sand like Carrots.

Potatos do not need to be dried nor to be stored in sand, but they are easily damaged by frost and turn green if exposed to the light ; small quantities are best heaped in a dry frost-proof shed or placed in barrels or boxes and covered with sacking.

Every care should be taken to store only perfectly sound roots and tubers ; those damaged in any way should be set apart for immediate use. In any case, the crops in store should be inspected every few weeks for, should disease make its appearance, it will spread quickly ; every damaged specimen is a potential source of danger to the rest of the batch.

Where there are larger quantities to be stored, it may not be possible to keep the root crops under cover; they should then be made into clamps, that is, stacked up on a well-drained site; straw is put over the pile and the whole covered with soil to a depth of 8 or 9 inches; the roots, especially Potatos, may "sweat," and to prevent fermentation setting up, ventilation holes should be left, but these should be blocked during periods of severe frost.

Parsnips and Jerusalem Artichokes can be stored if desired but are better left in the ground until required for use; Leeks also should be left in the ground and dug as required. As it would not be possible to dig should the soil become frozen, it is as well to dig a few and put under cover when frost is anticipated.

Peas and Haricot Beans intended for food should be removed from the pods and dried very thoroughly before being put away in suitable containers. Tomatos which are fully developed but not ripe can be kept for a considerable time and allowed to ripen slowly. They should be laid out in trays or boxes so that the fruits do not touch each other; the ripest ones can be left exposed to light and air, but those less far advanced should be kept in a warm (not hot) place in the dark; if each fruit is separately wrapped in soft paper (not newspaper for choice owing to risk of contamination from the print) they will ripen slowly in a dark cupboard, and though they will not be as full flavoured as those which ripened on the plants, they will be excellent for cooking and with care the supply can be carried on well into the new year.

Work to be done.—Onions should be lifted and ripened; maincrop Beet may be lifted towards the end of the month and stored. As soon as cold weather threatens all the fruit remaining on outdoor Tomatos should be picked and either used for chutney or put in a warm, dark place to ripen. Turnips can be sown early in the month for providing "tops" in spring, using a suitable variety, such as 'Green Top Stone.' Cabbages that were sown in August may be transferred to their permanent quarters as space becomes available. Celery should be earthed up again. *Frames.*—Cauliflowers for spring use may be sown from the middle to the end of the month.

Crops available from the garden in September.—Beet, Cabbages, Carrots, Cauliflowers, Lettuces, Marrows, Onions, Potatos, Ridge Cucumbers, Dwarf Beans, Runner Beans, Tomatos, Turnips.

The Fruit Garden.—The main work in the fruit garden this month will be the picking of the Apples and Pears. Varieties vary in time of readiness for gathering and no definite date can be given as to when picking should commence. Bear in mind that fruit picked before it is mature will not keep and will soon shrivel when put in store. There is, however, a good general test to apply to the late keeping Apples. Let the fruit remain on the tree as long as possible and when one or two fruits have dropped this is a fairly good indication that the first picking can be done. The way to do the picking is to take a fruit and lift it until the eye is pointing towards you. Give a slight twist and if the fruit stalk parts easily and cleanly from the spur with this slight leverage the fruit is ready for gathering. Never tug or pull off the fruit, but apply the prescribed test. Any fruits which are "stiff" should be left for a few more days when the tree is gone over again. It may be necessary to go over the tree four or five times at intervals of a few days. In order to avoid bruising, the fruit must be handled with care and it is advisable to use a basket lined with straw

for picking. Fruit with injuries, including those with no stalk, should be put with the "drops" to be used more or less immediately in the kitchen. Only sound and perfect fruit should be kept for storing. These are set out on trays or shelves, keeping the large, medium and small fruits together so as to economise space. The trays of fruit are placed in a cool, dark, airy but not draughty room or shed. Keep the atmosphere moist by damping the floor. Failing this place a shallow tray of water in the room. For some days the fruit will "sweat," that is, give off excess moisture, and when this has finished the fruit is finally stored in October, which will be described in the JOURNAL for that month.

Loganberries and cultivated Blackberries are pruned when the last of the fruit has been picked. Pruning consists of cutting out all the old fruiting canes and tying into their place the new canes made this summer. The new canes will in many cases exceed the height of the trellis, but leave the "tipping" until growth has finished. The Blackberry 'Himalaya Giant' is a very strong grower and with this variety it is advisable to leave one or two of the old fruiting canes, only spurring back the old fruiting trusses.

Should the Strawberries which were planted last month be dry give a thorough watering, cut off the runners as they appear and keep the bed free from weeds by occasional hoeing.

Autumn fruiting Raspberries have made good growth and where necessary they should be supported by running string along either side of the row, tying the string to stout poles driven in at the ends of the row. In a sunless autumn this Raspberry sometimes fails to mature a good crop, but this can often be avoided by preventing overcrowding of the canes, so cut out the weak canes and any others which it is necessary to remove in order to let sun and air get to the strongest canes which are kept for fruiting.

Gooseberry bushes attacked by American Gooseberry Mildew should be 'tipped' by cutting off a few inches from the ends of the shoots made this summer. Rake the prunings together and burn.

The early vinery will now be cleared and the laterals should be shortened by half their length in order to plump up the basal buds. Employ as much air as possible in the late vinery and maintain a dry atmosphere in order to encourage the bunches to finish.

CISTUS AND HELIANTHEMUM.

SOME time ago there was a query in the Journal (86, 294, August 1941) concerning the pruning of *Helianthemum* and *Cistus*: the correspondence received on this subject has not made the position much clearer as opinion seems to be almost equally divided. Some people find they can cut *Helianthemum* but not *Cistus*, whilst with others *Cistus* stands more drastic treatment than *Helianthemum*. It is probable that different species in each genus react differently to the knife and that no definite rule can be established.

REGINALD FARRER, 1880-1920.

By E. H. M. Cox.

REGINALD FARRER was born in 1880. Owing to ill-health as a child he was educated at his home at Ingleborough in Yorkshire, among those limestone hills that contain what is probably the best hill flora in the British Isles. From an early age he was interested in alpinism, and he made his first rock garden when he was only fourteen. After going to Oxford, where he helped BIDDER with his rock garden at St. John's, he passed most of his time gardening and plant collecting in the European Alps, which he knew thoroughly. He has left accounts of these European wanderings in a number of books, such as *Among the Hills* and *The Dolomites*, and in many articles in the horticultural press.

His attention was drawn to China, I think, through his researches in connection with his great work, *The English Rock Garden*, which was conceived in 1912 or earlier and written in 1913, although not published until 1919. During those days of hard work in botanical libraries he came across descriptions of the collecting done by PRZEWALSKI in the Ta-tung Alps and by POTANIN in the mountains round Siku, both in north-western Kansu. These areas struck him as possessing typical high alpine conditions with a promising flora worthy of further investigation and of introduction to our gardens.

FARRER was lucky in his companion, WILLIAM PURDOM, who had already travelled for VEITCH and the Arnold Arboretum in the Tsin-ling range in 1911. PURDOM was an excellent traveller and ultimately became inspector of forests in the Chinese government. He was, however, always shy and retiring, quite overwhelmed by FARRER's personality. PURDOM was a perfect companion who knew and respected the Chinese, and was much liked by them in return. It was largely owing to his tact that this Kansu expedition was a success. The Kansu-Tibet border was always in a state of nervous tension, at this time increased to boiling point by the general political conditions in China, and brigandage was rife.

During the first year, 1914, FARRER and PURDOM worked in the hills to the south of Lanchow, the capital of Kansu. These ranges form offshoots of the great central range of Min-shan. This was the country of POTANIN and, particularly, of his companion, BEREZOVSKI, the great Russian zoological collector. FARRER left the main road from Sian-fu to Lanchow, and at Tsin-chow began to work south-west to the Nan-hor, and the Shantan-yu alps. These FARRER called Satanee. In his usual energetic fashion he refused to follow the usual spelling of Chinese place names and formed his own phonetic parallels. This is not an aid to following his routes.

It was on this stretch of road that they first came across *Viburnum fragrans* as a wild plant. For centuries it had been popular in gardens throughout north China. It was first mentioned so long ago as 1750 by D'INCARVILLE in Peking gardens, but this was the first time that its native home had been discovered by a European. FARRER wrote of it: "Shallow scrub and coppice descended here to the track-side, and here we came on the *Viburnum*, at first isolated and suspicious, but soon in such quantity and such situations that one could no longer

doubt that here this most glorious of flowering shrubs is genuinely indigenous."

They made their headquarters at Siku, the one little Chinese town of the district, nestling at the foot of the high hills. Here they spent a peaceful spring, but there was always fear of trouble with the Tibetan monks of Chago, a nearby monastery. On the whole they were very successful in this little area which they worked thoroughly during May and returned to in August for the seed harvest.

In between they visited one of the drier areas of the main Minshan range, due west of Minchow. This was during the short wet season when this desolate country does produce its share of herbs for a few weeks. As FARRER said, it was a range of extremes, with mile after mile of enormous rolling downs, covered even in the rainy season with miserably poor herbage, and then, "mountains, stretching across the world from easterly to westerly in one unbroken range of impregnable eighteen-thousand-foot dolomite needles, crags, castles and pinnacles."

After wintering in Lanchow they went north-west in the direction of the Koko-nor as far as Sining, when they struck north to the Ta-tung alps (Datung of FARRER), this time PRZEWALSKI's country, to which he returned time and again. It is difficult to see why PRZEWALSKI was so attracted by this area. FARRER found the flora poor compared with that of the Siku hills, and was disappointed, although he tried to make the most of it in *The Rainbow Bridge*.

Possibly, if the war of 1914-1918 had not intervened, his Kansu expedition might have given us a number of new and permanent additions to our garden plants. There are a number, but not in great variety considering that he was in Kansu for two years. Among the most important are *Aster Farreri*, *Buddleia alternifolia*, first found in 1875 in the same neighbourhood by Dr. PIASETSKI but introduced by FARRER; *Buddleia Davidii* var. *nanhoensis*, an excellent dwarf variety that should be far more grown; *Meconopsis quintuplinervia*, introduced by PRZEWALSKI in 1872; but FARRER's was the main introduction, *Lilium leucanthum* var. *centifolium* and *L. Duchartrei* (*L. Farreri*), *Gentiana Farreri*, *Rosa Farreri*, the charming Threepennybit Rose, and *Viburnum fragrans*.

Only a few weeks ago I received the following in a letter from Sir WILLIAM WRIGHT SMITH, which bears out the importance of this expedition: "I was reminded of you yesterday for I have been trying to work out the full story of the Chinese Nivalids and have had to delve into the story of FARRER's two years in Kansu. This, of course, meant re-reading *On the Eaves of the World*. I am enjoying it beyond my first very hurried reading of it shortly after it was published. I am now getting a clear idea of what PURDOM and he did. My main impression is, however, that it is a wonderful travel book, well fitted to rival any other botanical tour. I do not know that it received sufficient attention in the post-war years, and I am not sure that the horticultural community is aware of how fine a story it is."

When FARRER returned home all ideas of gardening disappeared in the throes of war. He joined the Ministry of Information, and his only relaxation was writing. *On the Eaves of the World* and *The Rainbow Bridge* were written between 1916 and 1918, while the proof sheets of *The English Rock Garden* were corrected and considerable additions made during the same years.

The moment the end of the war came, which coincided with an

operation for appendicitis, he was off again. This time I was his companion. What FARRER really fancied was WILSON's country in western Hupeh and Szechuan, but this was quite out of the question owing to internal troubles in China. The Yunnanese ranges were being systematically covered by GEORGE FORREST, while Nepal, which FARRER also greatly fancied, was also impossible. Nothing would have induced him to go back to Kansu and north China. All that was left was Upper Burma, at that time still possessing large blanks to explore among the high ranges on the Chinese frontier and in the extreme north, bordering Assam.

The first year, 1919, we chose Hpimaw as our base, a military police post on a spur of the frontier range about 150 miles north of Myitkina, the railhead in Upper Burma. Being in the monsoon area this range has a large and varied flora, but except plants from the high tops, between 11,000 and 15,000 feet, many are of very doubtful hardness, some of them too soft even for Cornish gardens.

We spent the whole season from March to mid-November in working about 40 miles of that range as thoroughly as possible. It is difficult to do more owing to the thickness of the rain forest in the lower altitudes and the bamboo scrub higher up. Most of the plants we sent home have now disappeared, but here again a few of importance still survive. Among them are *Rhododendron sperabile*, *R. calostrotum* and *R. caloxanthum*, the Coffin Juniper at present called *Juniperus Coxii* of surprising hardness, and what is probably the best of the *Nomocharis*, *N. Farreri*, which is still usually listed as *N. pardanthina* var. *Farreri*.

When I had to return home in the winter of 1919-1920 FARRER spent a few months at Maymyo. He then travelled up the western branch of the Irrawady, the Mali-hka, to Putao or Fort Hertz, and struck due east again to explore the frontier range about 120 miles north of where we were the year before. The reason for this long detour was the difficulty of the country up the N'mai-hka north of where we left it to go to Hpimaw.

That year FARRER was in far wilder country with, if anything, an even more impossible climate. It sapped his strength and his vitality. He died on October 17, 1920. He had been able to collect herbarium material of a very fine set of plants. He was even in the middle of the seed harvest when he died. In one of his last letters to me he described the innumerable paper trays that he had spread round his hut, trying to get the seed capsules dry in that land of everlasting rain and mist. The dried material came home, but the seed harvest was lost.

From what we have learnt from this dried material and from other collectors the flora of the three valleys and passes in which he worked, the Chawchi, the Moku-ji and Shing Hong, is not only rich but extremely spectacular, although such is the humidity and lack of sunshine that it is very doubtful if much would survive our drier and more austere climate except, again, those plants from the high tops. It is the country of *Primula sonchifolia*, as indeed is Hpimaw, and of *P. Agleniana*, probably the finest of all the *Nivalis* group. It is the home of *Nomocharis basilissa*, the scarlet *Nomocharis*, and of about another four species of this lovely genus. It is the country of *Rhododendron Kyawi*, which we also found at Hpimaw, *R. aperantum*, *R. chaetomallum* and *R. charitopes*. But you will note that no popular plants come from that range.

It is useless to speculate on what FARRER would have done had he lived. Possibly he would have gone on collecting. Probably he would have retired from active work and taken more and more to writing.

I cannot end better than quote a paragraph I wrote ten years ago in the introduction to *The Plant Introductions of Reginald Farrer*. "Even after the lapse of eleven years I have a vivid memory of FARRER in the hills, his stocky figure clad in khaki shorts and shirts, tieless and collarless, a faded topee on his head, old boots and stockings that gradually slipped down and clung about his ankles as the day wore on. The bustle of the early start; the constant use of the field glasses which always hung about his neck; the discussions, very one-sided owing to my ignorance, about the value and relationship of various plants; his intense satisfaction when a plant was once in the collecting tin and was found worthy; his grunt of disapproval when it was worthless; the luncheon interval with its cold goat rissole and slab chocolate; his enjoyment of our evening tot of rum, a necessity in the rains; and, above all, his indomitable energy that never spared a frame which was hardly built for long days of searching and climbing. All these, I say, are as fresh to me as if they had happened yesterday."

FOOTNOTE TO FARRER.

By HUMPHREY DENHAM.

LITTLE enough is known of the background of REGINALD FARRER'S life. His home was at the foot of Ingleborough, with its limestone terraces and swallow holes, where in some years *Primula farinosa*, *Gentiana verna* and *Saxifraga oppositifolia* faintly emulate the jewelled turf of the Alps. His father was himself a dilettante author, with half a dozen books to his credit, and a High Sheriff of Yorkshire, with all that that implies. FARRER was educated privately as a boy, possibly owing to a cleft palate, which would have made life uncomfortable for him at a public school. (His brother, nine years younger, went to Eton.) REGINALD went up to Balliol College, Oxford, in the family tradition: his father and his great-uncle had preceded him, and there was such a clan of Yorkshire FARRERS in the Registers of the College that in the second edition of 1934 it was found necessary to give a family tree to them. His tutors at Balliol were FORBES, DE PARAVICINI, and STRACHAN DAVIDSON, who later succeeded CAIRD as Master. He took a second in Classical Mods. and a third in Greats "*Litterae Humaniores*," and was president of a College Society, the Foderingeye, now extinct.

The rest of his life was to be devoted mainly to the humaner letters and to botany (he preferred to call himself a botanist), both, it may be said not unkindly, varying between second and third class—on the Oxford notation, Beta Query to Gamma Minus.

He left Balliol in 1902, and in 1903 embarked on a Grand Tour which embraced China, Japan, Korea and Canada. The fruits of this, published in 1904 under the title of *The Garden of Asia*, gave him a taste of the joys of authorship, which he never lost. Quite apart from his horticultural works, which are well enough known not to need cataloguing, in the next few years he published the following: *The*

House of Shadows, The Sundered Streams, The Ways of Rebellion, The Anne Queen's Chronicle, In Old Ceylon, Through the Ivory Gate (censored), *The Dowager of Jerusalem, Vasanta the Beautiful and The Void of War*. There was also a memorial article on JANE AUSTEN in the *Quarterly Review* of July 1914, of which he thought highly enough to place on record.

At an uncommonly early age he had become a J.P. for the West Riding, and a County Councillor. In 1911 he failed to convince the electors of Ashford of the beauty of the Liberal cause (also a family tradition). He saw further public service as a clerk in the Foreign Office in 1916, when on his return from China the Army rejected him on medical grounds.

Considered as a human being FARRER presents a number of contradictions. A Yorkshireman with an inferiority complex is of some interest to the psychologist; an English Magistrate who became a Buddhist, as much to annoy his parents—so the story goes—as to further his travels, perhaps even more so. As a sentimental (and highly extrovert) *flâneur* with a taste for mild adventure in high places, his literary value in a changing world has perhaps passed its peak. As a practitioner in two lines of horticulture (Alpine plants and Rhododendrons, which finally obsessed him to the extent of causing his death), FARRER's name is still very real to unnumbered British gardeners, and it is FARRER the enthusiast, FARRER as a judge of a plant, who must be considered. Most of the plants which he introduced were known to botany, many of them indeed were in cultivation, as, for instance, *Viburnum fragrans*: but his achievement, for all his failures, was enormous. In his earlier days, prior to his Chinese adventures, FARRER's judgment seems to have been influenced to some extent by his small venture in nursery gardening at Ingleton, partly by the daemon of the collector who holds *omne ignotum pro magnifico*. The rarity value of a plant offset many other considerations in his eyes. For some years I amused myself by following his footsteps round the Alps—a process made rather intricate by his romantic alterations of place names—a trick which makes it almost impossible to correlate even his own sketch maps of the Chinese journeys with his text. Climbing single-handed is an uncomfortable pursuit at all times, and in frontier regions more so than elsewhere. In the Mt. Cenis area I walked into a summer school of Italian Officers, with maps all spread, well on the French side of the frontier, and discovered that *Campanula cenisia* was not all it had been made out to be. At Valdieri, pack artillery on manœuvres perhaps caused me to dislike *Viola valderia* more than I might have done otherwise. In *Saxifraga florulenta* I could find no redeeming features at all, having been shot at earlier in the day and later fallen through a snow bridge into a stream, which ended (I had to walk down it) over a precipice. Late in the afternoon of the same day, coming to the summer village, then deserted, where FARRER had his famous contretemps over the teapot, I found *Primula viscosa* and *Saxifraga pedemontana* beyond praise. On the whole I found his enthusiasm justified by the plants as they grew: my forebodings on their ultimate behaviour in the garden were, unhappily, equally justified.

FARRER considered himself a botanist: he was quite at home in that arid branch of botany which concerns itself with herbarium specimens, and evidence of his mastery of the subject is to be found in the *Icones plantarum Alpinarum* of MARRET, which he supported lavishly

in its early stages : a great work, scientifically planned, with distribution maps and all, but never, alas, completed. He differed from the botanist of the *Hortus siccus* in that he had a lively visual imagination which could picture the dried specimen as a living plant ; and once he had formed such a picture and found it good, he had no rest until he had seen it with his own eyes. Having found it, he unleashed his adjectives : his object was to get it into gardens, and his prose, as over-coloured as the old-time labels on penny seed packets, was his own means of advertising his predilections to the world. It must be granted, even by those who profess abhorrence for his literary efforts, that in this he was successful. In the wider field of Botany, in the knowledge of how a plant lived (as opposed to what it looked like, living), he was definably lacking ; and I can remember CORREVON, in his parched little nursery at Geneva, declaiming with frenzy over some geological solecism which FARRER had perpetrated about his findings in the Mt. Cenis area.

Apart from his horticultural introductions, his influence on contemporary practice is a debatable subject. I believe it myself to have been large, perhaps because I was myself largely influenced while I was still an undergraduate. But I was influenced far more by BIDDER, and WILLIAM BOWELL, and the St. John's Garden ; and despite a romantic legend, printed soon after FARRER's death, I maintain the view of BIDDER and BOWELL (and incidentally of Sir WILLIAM SOMERVILLE, who influenced them both in his quiet way more than is generally known) that it was this garden in its small beginnings which turned his attention first to Alpine and Rock plants : there is no shadow of truth in the suggestion that he was in any way responsible for its inception or growth, except that its peculiar construction may have been maintained from sheer contrariness to FARRER's precepts.

Each time I pick up *The Eaves of the World* or *The Rainbow Bridge*, I am struck afresh with the tremendous intellectual task which FARRER undertook in his Chinese adventure, even with PURDOM as his guide and mentor.

The trained botanist in the European Alps, ground which has been worked over again and again, finds difficulty often enough in identifying a species which he may have seen many times in plates, even in gardens, as well as in herbarium specimens. FARRER, working over ground the fringes of which had been touched by POTANIN or PRZEWALSKY, with only their herbarium material to guide him, had to rely mainly on his intuition, and it seldom betrayed him : though confirmation, or better still, the congratulation of 'Sp. Nova Farrer,' from R.B.G., Edinburgh, half a world away, might take years to reach him. To add to his difficulties he took the proofs of the *English Rock Garden* with him, and corrected them in Lanchow, in a world of Chinese politics, in his first winter in China, and wrote up his travels for the *Gardeners' Chronicle* at the same time. The tale of his adventures among brigand bands and wolves is small beer in the world of to-day ; his more human adventures are still good reading, with a touch of humanity he never drew from JANE AUSTEN.

He found something like real happiness in Tien-Tang—the Halls of Heaven. I like most to think of this queer, pompous, lovable little Yorkshireman sitting in the stalls of his Tibetan Monastery, and watching, over interminable bowls of buttered tea, the unfolding of a day-long ritual in the incense laden gloom. It was escape for him,

utter and complete, from a world torn by war. The last words of his preface of 1918 should be recorded again :

"The guns may roar for their time, and lay a world in ruins round us ; but now the Irises are blooming again at the Halls of Heaven. And when the guns are broken and silent once more, the Irises will still go on blooming year by year. But the Halls of Heaven are a long way hence."

A long way indeed. But I should like to grow that Iris—" *Iris ensata* in its loveliest Tibetan form." FARRER's technique still works.

(Reproductions of four of FARRER's water-colour sketches, now in the possession of the Royal Horticultural Society, are reproduced in Figs. 95-98 ; the text accompanying them is taken from notes on the sketches or on the mounts which are in FARRER's handwriting.—ED.)

THREE STRIKING LILIES.

LILIES were a special feature of the Society's Monthly Show in July, and many species and hybrids were exhibited. The Banksian Medal offered for the best new hybrid Lily shown by an amateur was awarded to Colonel F. C. STERN for a spike of *Lilium* 'Frank Jones.' This fine plant, which attained a height of 56 inches, has flowers only a little smaller than those of *L. × testaceum* and of Saturn-red (H.C.C. 13/1), i.e. the colour of *L. Willmottiae*. In form, as well as colour, the flowers were intermediate between *L. chalcedonicum* and *L. testaceum*, the segments being less reflexed than in *chalcedonicum* while the flowers were more symmetrical than those of *testaceum*. The seedling was one of a number which came to Major STERN from the raiser, Mr. FRANK JONES, who gave the parentage as *chalcedonicum maculatum* × *candidum*, but as may be gathered from what has been said, coupled with the fact that the flowers have no spots, one would have supposed the parents to be *chalcedonicum* and *testaceum*.

Lord SWAYTHLING exhibited several orange-yellow hybrids which were raised by his gardener, Mr. F. J. ROSE, from pods of *L. Roezlii* growing near *L. Parryi*. The flowers were much reflexed, with a varying number of purple spots, and appeared to be hybrids between the two above-named Lilies. In form and ground-colour some of the flowers were very similar to *L. pardalinum Warei* as seen in MOON's figure in *The Garden* for June 5, 1886, but the flowers of MOON's plant had no spots and the leaves were much broader than those of Lord SWAYTHLING's hybrids.

A third Lily which attracted much attention was shown by Dr. M. AMSLER. At first sight it appeared to be an unspotted, orange-coloured seedling of *L. canadense*, but the pollen was yellow instead of brown, and the style was purplish-red instead of yellow. The flowers were rather larger than those of the average *canadense*, some having a spread of over 4 inches, but the segments were a little narrower than in *canadense* (although the foliage leaves were if anything broader) and in transverse section the segments were more concave than those of *canadense*, which are almost flat in section. The classification of the plant was left in doubt by all who examined it carefully, as was the case when Dr. AMSLER showed it in 1941. Most competent observers seemed to suspect a hybrid origin, with *canadense* as one parent. Dr. AMSLER acquired the plant as an imported bulb.

FURTHER NOTES ON THE GARDEN HYDRANGEAS.

By MICHAEL HAWORTH-BOOTH.

SINCE my last notes (R.H.S. JOURNAL, 65, 388) some further forms and varieties of the garden Hydrangeas have come to light. Some of the most interesting were in a consignment, received from a well-known firm of nurserymen in Guernsey just before the tragedy occurred. Others have been kindly sent by friends and correspondents who have found plants that they could not identify from the previous notes on the race.

Further study of *Hydrangea macrophylla* forma *normalis* indicates that there are three distinct forms which are propagated as clones. Firstly, there is the large, coarse plant with a thin, widespread umbel. The sterile flowers round the margin are sparse and the sepals are a milk white. The fertile flowers in the centre are strongly developed and set seed freely. This appears to be the typical wild form; I obtained a specimen in the Guernsey consignment, and there is one at Grayswood Hill which is thought to have come with the original importation. It is interesting to have a plant in a collection but it has little value as a decorative flowering shrub. Secondly, there is a type with rather more acuminate leaves, the flowers having more substance, blue or pink with the sepals of the sterile ones markedly pointed. It is not such a strong grower, but is quite a decorative flowering shrub though it does not equal the third type. This is the one shown in a previous article as growing at Grayswood Hill, and is a first-class garden plant with still larger and more solid and richly coloured flowers. I have obtained specimens from a number of sources under the name of 'Mariesii,' but it is readily distinguished from the latter by the fact that the flowers are arranged in a flat umbel instead of the almost corymbose shape of the head, with pink sterile flowers of all sizes dotted about, which is characteristic of var. *Mariesii*.

Few plants vary their habit more in accordance with the conditions under which they are grown than these Hydrangeas; identification is, therefore, sometimes difficult with freshly moved plants or those which are growing in unusual circumstances. Even the weather may affect the habit in such a way as to bring about a temporary change of form. For instance, last season, owing to the great amount of rain that fell at the time the flower heads were expanding, all the sterile flowers on the best form of *normalis* swelled out their sepals to an even, rounded shape with none of the graceful serrations which are usually an attractive feature.

Among the sterile flowered varieties, *Hydrangea macrophylla* proper, which for convenience we may term the Hortensias, the only interesting newcomer is one in which the sepals are doubled. The colouring is, unfortunately, weak, but the plant has not had time to establish itself fully yet, so this may improve. The form of the flower head is quite attractive, the sepals being only doubled once and of regular shape.

Among the garden varieties of *Hydrangea serrata* I have been much surprised at the high decorative value, as a flowering shrub, of *H. serrata* var. *acuminata*. Some very weak and spindly specimens were planted out in a bed where the soil had been well enriched with

leaf mould and the weak stems cut down to within a few inches of the ground. They developed into fine bushy plants which flowered profusely this season. The blue colouring was very rich and even and the group made a fine mass effect.

The only member of the *serrata* group to equal, and indeed improve upon, this performance was the variety 'Grayswood,' which, as usual, started off with a fine show in blue and white, then the flowers turned to a red and white mixture, then to a uniform deep red and finally to claret.

It is not always easy definitely to assign a *Hydrangea* to either the *serrata* or the *macrophylla* group; some, like 'Wizenboss' and 'Sterile,' look like hybrids although they have well marked *serrata* characteristics. Seedlings are being raised and we shall probably learn a good deal from them. (See Figs. 100-102.) An old plant was discovered at Grayswood Hill which appears to be identical with the sterile variety in habit except that it has an inner ring of fertile flowers. To get an accurate idea of the plant, however, it will have to be regrown so as to produce fresh young shoots.

The neglect of war time, when the insatiable demands of the farm-work precluded any possibility of my finding the time to give any attention to the shrub garden, made it plain how very desirable it is to keep *Hydrangeas* pruned in the manner advocated in *The Flowering Shrub Garden* and to keep them well mulched with some moisture-retaining material. For health and bloom what is wanted is to keep the plant on young but well ripened wood. When a long neglected plant gets leggy and gnarled it may be earthed up a little with a rich light compost and then divided the following season, rather in the manner practised with some of the Heaths. But the better plan is to take and strike all the available cuttings and then to cut the old plant down to about six inches and to mulch well with leaf mould.

As regards the hardiness of *H. macrophylla* and its varieties, the fact that in recent severe winters they were often sheeted in ice for days on end and subjected to alternate freezing and thawing over long periods leads me to think that, like *Camellia japonica*, we have rather taken the tenderness of the plants for granted. Provided that the *Hydrangea* is grown in soil on the poor side, well exposed to the sun, but kept sufficiently mulched to prevent wilting in summer heats, I feel sure that it could be grown as a hardy open air shrub in nearly all the southern counties. There must be literally thousands of starved miserable specimens languishing in pots about the green-houses of the country. If gardeners who have some plants would plant a few out in spring under the conditions described and let us have the benefit of their experience I think we should find it surprisingly encouraging. For those who would have a good show of bloom in their shrub gardens throughout the summer the *Hydrangea* is as essential for July and August effect as the Cherries of April, the Azaleas of May, or the Roses of June.

SOME LESSER KNOWN MONOGRAPHS ON HARDY HERBACEOUS PERENNIALS.

By WILLIAM T. STEARN.

DURING the last sixty years interest in hardy perennial plants has notably increased. As the wish for specific information became more insistent, so a number of monographs and revisions of genera made their appearance. Certain of these works cater mainly for the practical gardener, stressing horticultural values in preference to scientific, and they draw their authority in matters botanical from earlier works; others are more scientific and original. Gardeners and botanists use the term "monograph" somewhat differently. To a gardener a monograph is any systematic work devoted to a single group of plants. To a botanist a monograph is as complete an account as can be made at a given time of any one family, tribe or genus, "nothing being neglected which is necessary for a perfect knowledge of it"; and a modern work, with no matter how detailed descriptions and synonymy, which ignores or gives scant attention to anatomy, cytology, geographical distribution and economic uses, is not a monograph. For works concerned solely with the description, classification and nomenclature of a group, the terms "account," "conspectus," "review," "revision," "survey" ("Uebersicht" in German), "study" and "synopsis" are used instead. Most of the works in the following list are revisions rather than monographs. Hardy herbaceous groups dealt with during this period in excellent horticultural and botanical handbooks include: Amaryllidaceae (by J. G. BAKER, 1888), Crocus and Colchicum (by E. A. BOWLES, 1924), Gentiana (by D. WILKIE, 1936), Iridaceae (by J. G. BAKER, 1892), Iris (by R. I. LYNCH, 1904; W. R. DYKES, 1912, 1924), Lilium (by A. GROVE, 1911; E. H. WILSON, 1925; H. B. D. WOODCOCK and J. COUTTS, 1935), Meconopsis (by G. TAYLOR and E. H. M. COX, 1934), hardy monocotyledons in general (by C. H. GREY, 1937-8*), Narcissus (by E. A. BOWLES, 1934), hardy Orchidaceae (by A. W. DARNELL, 1930), Primula (by J. MACWATT, 1923; E. H. M. COX and G. C. TAYLOR, 1928), Saxifraga (by W. IRVING and R. A. MALBY, 1914), Sedum (by R. L. PRAEGER, 1921), Sempervivum (by R. L. PRAEGER, 1932) and Tulipa (by A. D. HALL, 1929, 1940). These books are household words in the garden world and most of them are still on sale.

Nevertheless, purely scientific plant studies were not neglected—indeed their bulk and range of subject much exceeds the horticultural—but they are mostly scattered through journals, and in the absence of a general index to them are difficult to find. Das Pflanzenreich (Leipzig), begun under the editorship of ADOLF ENGLER and continued by LUDWIG DIELS, is a noteworthy series of monographic works, the Annals of the Missouri Botanical Garden (St. Louis, Missouri) another. Of Das Pflanzenreich the volumes best known in England are on Saxifragaceae—Saxifraga (Heft 67, 69 or iv. 117), by A. ENGLER and E. IRMSCHER (1916-19), and Primulaceae (Heft 22 or iv. 237), by F. PAX and R. KNUTH (1905). Among others of horticultural interest are those on Lythraceae (Heft 17 or iv. 216), by E. KOEHNE (1903), Zingiberaceae (Heft 20 or iv. 26), by K. SCHUMANN (1904), Geraniaceae

* Hardy Bulbs, by C. H. GREY; vol. 1 (Iridaceae), published 28 Sept. 1937; vol. 2 (Amaryllidaceae, etc.), 12 April 1938; vol. 3 (Liliaceae), 8 Nov. 1938.



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FIG. 94 — REPRESENTATIVES OF THE HORTICULTURAL TRADE INSPECTING THE LIASE AND LEND VARIETIES OF CABBAGE AT WISLEY JULY 17, 1942



FIG. 95 — "GENTIANA FARRERI — LAC CLAIR — AUG. 31 15"
(See p 293)



FIG. 96 - "THE HAREBELL POPPY, *MECONOPSIS QUINTUPLINERVA* - HIGH
LAWNS OF THE DA-TUNG ALPS - JULY 8, 1914"
(See p. 293.)



FIG 97 - " IRIS TENUIFOLIA IRIS SP (OVARY UNDERGROUND) CHEBSON SSU
MAY 30/15. (SHOWING THE FAMOUS FORESTS ROUND THE MONASTERY)
IRIS HYPOGAEA "

I. hypogaea was the provisional name used by Farrer.

(See p. 293.)



FIG. 98. "THE WHITE FLOWER OF THE HOLY WELL, *TROLLIUS PUMILUS*
PERFECTISSIMUS, GONE WHITE IN PROXIMITY OF THE BUDDHA WOI-
VERDEN JULY 1-15"

(See p. 293.)



Photo, A. K. Gould.]

FIG. 99. *PEROWSKIA ATRIPLICIFOLIA* AT WISLEY.
(See p. 283.)



FIG. 100.—*HYDRANGEA MACROPHYLLA* VAR. *NORMALIS*, THE COMMON,
WILD FORM.
(See p. 294.)



FIG. 101. *HYDRANGEA SERRATA*
(See p. 294.)



FIG. 102.- *HYDRANGEA SERRATA* VAR. *ACUMINATA*.
(See p. 294.)



FIG 103. *LILIUM MARTAGON ALBUM*
(See p. 308.)

(Heft 53 or iv. 129), by R. KNUTH (1912), Papaveraceae (Heft 40 or iv. 104), by F. FEDDE (1909), Polemoniaceae (Heft 27 or iv. 250), by A. BRAND (1907), Oxalidaceae (Heft 95 or iv. 130), by R. KNUTH (1930). Uniform quality in so vast an enterprise is not to be expected and some volumes have come in for severe criticism. All may be consulted in the Lindley Library of the Royal Horticultural Society, and those who find their Latin at times a little rusty or are ignorant of the special botanical meanings which classical words have acquired should refer to B. D. JACKSON'S *Glossary of Botanic Terms* (4th ed., 1928), an invaluable book.

Below is an alphabetical list of some lesser known monographs and revisions of hardy herbaceous perennials. Most of them were originally published in botanical journals and the transactions of scientific societies and academies and, since the number of reprints granted to an author is usually small, antiquarian booksellers catalogue them as scarce. This list makes no claim to completeness; lack of space has prohibited comment. An interesting article by Mr. E. A. BOWLES, "Monographs for an amateur gardener's library," will be found in *JOURNAL R.H.S.*, 43, 359-371 (1919); most of the works mentioned there are now fairly well known, and were published over sixty years ago, and are not mentioned below.

A star (*) indicates an illustrated work.

- ACAENA. "Die Gattung Acaena." By G. Bitter. *Bibliotheca botanica*. 74. (pp. 1-248, 1910; pp. 249-336, 1911).*
- ACHILLEA. "Monographia sectionis 'Ptarmica' Achilleae generis. Die Arten xxx der Section Ptarmica des Genus Achillea." By A. Heimerl. *Denkschr. Akad. Wiss. math.-nat. Wien*. 48. 113-192 (1884).*
- ACONITUM. Monographia generis Aconiti. By H. G. L. Reichenbach. 100 pages (Leipzig; fasc. 1-2, pp. i-iv, 1-72, tt. 1-6 in 1820; fasc. 3-4, pp. 73-100, tt. 7-18 in 1821).*
- Illustratio specierum Aconiti generis.* By H. G. L. Reichenbach. 148 pages (Leipzig, 1823-27).*†
- "The aconites of India, a monograph." By O. Stapf. *Ann. Calcutta bot. Gard.* 10. part 2, pp. 115-197 (1905).*
- "Systema Aconiti generis." By R. Rapaics. *Nov. Közlem.* 6. 136-176 (1907).
- "Vorbereiten zu einer Monographie der europäischen Aconitum-Arten." By G. Gayer. *Magyar bot. Lapok.* 8. 114-206 (1909).
- "Plantae sinenses. Aconitum L." By H. Handel-Mazzetti. *Acta Horti Gothoburg.* 18. 64-132 (1939).
- ALCHEMILLA. "Systematik und Geographie der Subsektion Calycanthum der Gattung Alchemilla L." By W. Rothmaler. *Fedde, Repert. Sp. nov. Beih.* 100. 59-93 (1938).*
- ALLIUM. "Alliorum adhuc cognitorum monographia." By A. Regel. *Acta Horti Petrop.* 3. part 2. 266 pages (1875).
- ALTHAEA. "Synopsis of genera and species of Malveae: 4, Althaea." By E. G. Baker. *Journ. of Bot.* 28. 140-145, 207-209 (1890).
- AMSONIA. "A monograph of the genus Amsonia." By R. E. Woodson. *Annals Missouri bot. Gard.* 15. 379-434 (1928).*
- ANCHUSA. "Species Anchusae generis Linn. hucusque cognitae." By M. Guşuleac. *Fedde, Repert. Sp. nov.* 26. 286-322 (1929).*
- ANDROSACE. "A revision of the Chinese species of Androsace." By H. Handel-Mazzetti. *Notes Roy. Bot. Gard. Edinburgh.* 15. 259-298 (1927).
- ANEMONE. "Anemonarum revisio." By G. A. Pritzel. *Linnaea.* 15. 561-698 (1841).*
- "Über die systematische Gliederung und geographische Verbreitung der Gattung Anemone L." By E. Ulbrich. *Engler, Bot. Jahrb.* 37. 172-256 (1905), 257-334 (1906).*

† The dates of publication of Reichenbach's *Illustratio generis Aconiti* have yet to be ascertained in full detail, but, judging from notices in *Flora, Regensburg* and Hinrichs, *Verz. neuer Bücher*, publication was as follows: fasc. 1-4, tt. 1-24 in 1823; fasc. 5-6, tt. 25-36 in 1824; fasc. 7-9, tt. 37-54 in 1825; fasc. 10-12, tt. 55-72 in 1827.

- APOCYNUM.** "A critical study of the Apocynoideae with special reference to the genus *Apocynum*." By R. E. Woodson. *Annals Missouri bot. Gard.* 17. 1-212 (1930).*
- AQUILEGIA.** "Verwandschafts-Verhältnisse und geographische Verbreitung der in Europa einheimischer Arten der Gattung *Aquilegia*." By A. Zimmerer. *Jahres-Bericht Staats-Ober-Realschule zu Steyr.* 5. 1-66 (1875).*
- "A synopsis of the known forms of *Aquilegia*." By J. G. Baker. *Gard. Chron.* New ser., 10. 19-20, 76, 111, 203 (1878).
- "De genere *Aquilegia*." By R. Rapaics. *Bot. Közlem.* 8. 117-136 (1909).
- "The North American species of *Aquilegia*." By E. B. Payson. *Contrib. U.S. Nat. Herb.* 20. 133-152 (1918).*
- ARENARIA.** "A revision of the genus *Arenaria*." By F. N. Williams. *Journ. Linn. Soc. Bot.* 33. 326-437 (1898).
- ARMERIA.** "Armerias, native and cultivated." By G. H. M. Lawrence. *Genes Herb.* 4. 390-418 (1940).*
- ASARUM.** "The genus *Asarum*." By W. B. Hemsley. *Gard. Chron.* 3rd ser., 7. 420-422 (1890).
- ASTER.** "Species and variations of Biotian Asters, with discussion of variability in *Aster*." By E. S. Burgess. *Mem. Torrey Bot. Club.* 18. 419 pages (1906).*
- ASTRAGALUS.** "Generis *Astragali* species gerontogaeae." By A. Bunge. *Mém. Acad. Sci. St.-Petersb.* 7th ser., 11, part 16 (1868), 15, part 1 (1869). 140 + 254 pages.
- Revision of North American species of *Astragalus*. By M. E. Jones. 330 pages (Salt Lake City, 1923).*
- ASTRANTIA.** "Monographie du genre *Astrantia*." By J. Grintzesco. *Annales Cons. Jard. bot. Genève.* 13-14. 66-194 (1910).*
- AUBRIETA.** "The species of the genus *Aubrieta* Adanson." By J. Mattfeld. *Bull. Alpine Gard. Soc.* 7. 157-181, 217-227 (1939).*
- BAPTISIA.** "Monograph of the genus *Baptisia*." By M. M. Larisey. *Annals Missouri bot. Gard.* 27. 119-244 (1940).*
- BERGENIA.** "The genus *Bergenia*." By C. K. Schneider. *New Flora and Silva.* 4. 132-137 (1932).*
- BESSEYA.** See under **SYNTYRIS**.
- BRODIAEA** (sensu lato). "A definition of the genus *Brodiaea*." By R. F. Hoover. *Bull. Torrey bot. Club.* 66. 161-166 (1939).
- "A revision of the genus *Brodiaea*." By R. F. Hoover. *Amer. midland Nat.* 22. 551-574 (1939).
- "The genus *Dichelostemma*." By R. F. Hoover. *Amer. midland Nat.* 24. 463-476 (1940).
- "A systematic study of *Triteleia*." By R. F. Hoover. *Amer. midland Nat.* 25. 73-106 (1941).
- CALOCHORTUS.** "A monograph of the genus *Calochortus*." By M. Ownbey. *Annals Missouri bot. Gard.* 27. 371-560 (1940).*
- CALTHA.** "Monographie der Gattung *Caltha*." By E. Huth. *Helios.* 9. 55-78 (1892).* 99-103 (1893).
- CAMPANULA.** Monographie des Campanulées. By Alphonse de Candolle. 384 pages (Paris, 1830).*
- "Campanulaceae." By Alphonse de Candolle. De Candolle, *Prodromus.* 7, part 2, pp. 414-496 (1839).
- "An annotated list of the species of *Campanula*." By R. H. Beddome. *Journ. Roy. Hort. Soc.* 32. 196-221 (1907).*
- CARDAMINE** (including **DENTARIA**). "Monographie der Gattung *Cardamine*." By O. E. Schulz. Engler, *Bot. Jahrb.* 32. 280-623 (1903).*
- CASTALIA.** See **NYMPHAEA**.
- CEPHALARIA.** "Geschichte der Gattung *Cephalaria*." By Z. Szabó. *Magyar bot. Lapok.* 24. 1-14 (1926).
- "Dispositio specierum generis *Cephalaria* Schrad." By Z. Szabó. *Magyar bot. Lapok.* 25. 49-55 (1927).
- CICERBITA** (**MULGEDIUM**). "Le genre *Cicerbita*." By G. Beauverd. *Bull. Soc. bot. Genève.* 2nd ser., 2. 99-144 (1910).*
- CODONOPSIS.** "Revisio critica specierum generis *Codonopsis* Wall." By V. L. Komarov. *Acta Horti Petrop.* 29. 98-121 (1908).*
- "A revision of the genus *Codonopsis*." By T. F. Chipp. *Journ. Linn. Soc. Bot.* 88. 374-391 (1908).*
- "A key to the genus *Codonopsis*." By J. Anthony. *Notes Roy. Bot. Gard. Edinburgh.* 15. 173-190 (1926).*
- COLCHICUM** (including **MERENDERA**). "Monografiya na roda *Colchicum*." By B. Stefanoff. *Sbornik na B'lg. Akad. Nauk.* 22. 100 pages (Sofia, 1926).

- COREOPSIS. "Revision of the genus Coreopsis." By E. E. Sherff. *Field Mus. Nat. Hist., Publ. Bot.* 11. 277-475 (1936).*
- CORTADERIA. "The pampas grasses, Cortaderia Stapf." By O. Stapf. Robinson, *Flora and Sylva*. 3. 171-176 (1905).
- CREMANTHODIUM. "The taxonomy and geography of the Sino-Himalayan genus Cremanthodium Benth." By R. D'O. Good. *Journ. Linn. Soc. Bot.* 48. 259-316 (1929).*
- CYANANTHUS. "Revision of the genus Cyananthus." By C. V. B. Marquand. *Kew Bull.* 1924. 241-255 (1924).*
- CYCLAMEN. Die Gattung Cyclamen L., eine systematische und biologische Monographie. By F. Hildebrand. 190 pages (Jena, 1898).*
- "Cyclamen-Studien." By O. Schwarz. *Gartenflora*, N. F. 1. 11-38 (1938).*
- "Monographie der Gattung Cyclamen auf morphologisch-zytologischer Grundlage." By F. Glasau. *Pflanz. 30.* 507-550 (1939).*
- DELPHINIUM. "Monographie der Gattung Delphinium." By E. Huth. Engler, *Bot. Jahrb.* 20. 322-499 (1895).*
- The garden of larkspurs. By L. H. Bailey. 116 pages (New York, 1939).*
- DENTARIA. See CARDAMINE.
- DIANTHUS. "A monograph of the genus Dianthus Linn." By F. N. Williams. *Journ. Linn. Soc. Bot.* 29. 346-478 (1893).
- "Studies in the perennial species of the genus Dianthus, L." By F. Lemperg. *Acta Horti Gothoburg.* 11. 71-134 (1936).
- The garden of pinks. By L. H. Bailey. 142 pages (New York, 1938).*
- DIGITALIS. Digitalium monographia. By J. Lindley. 27 pages (London, 1821).*
- DICHELOSTEMMA. See under BRODIAEA.
- DIERAMA. "The genus Dierama K. Koch and Bouché." By N. E. Brown. *Journ. Roy. Hort. Soc.* 54. 193-202 (1929).
- DORONICUM. "Etude sur les Doronicum à fruits homomorphes." By F. Cavillier. *Annuaire Cons. Jard. bot. Genève.* 10. 177-251 (1907).*
- "Nouvelles études sur le genre Doronicum." By F. Cavillier. *Annuaire Cons. Jard. bot. Genève.* 13-14. 195-368 (1911).*
- ECHINACEA. "A critical study of certain epappose genera [Balsamorhiza, Zaluzania, Greenmaniella, Iostephane, Echinacea, Ratibea] of the Heliantheae-Verbesinaceae of the natural family Compositae." By W. N. Sharp. *Annals Missouri bot. Gard.* 22. 51-148 (1935).*
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And there are others.

OUTSTANDING NEW DAFFODILS OF 1942.

IN these days of petrol and transport restrictions one does not see many flowers apart from one's own. However, fortunately I was able to get over to the London Daffodil Show, and also to pay a visit to the BRODIE OF BRODIE.

Being much occupied with my own exhibits during three very busy days at the Show, I was unable to make any notes, but several flowers, chiefly amongst Mr. J. L. RICHARDSON's grand lot, stick in my memory. He had some half-dozen or so varieties before the Narcissus Committee, which gained Awards of Merit. Some of these, of course, have been seen before, but are of sufficiently outstanding merit to be noted here: e.g. 'Narvik,' a tall and very well formed Incomp., of highest exhibition quality, having perfectly smooth, broad, cleanly shovel-pointed brilliant lemon-gold perianth, and neat, rather goblet-shaped crown of quite startlingly dark and brilliant orange crimson. 'Buncrana,' a most beautiful and distinct bicolor Incomp., of very high quality, having very broad, flat, satin-smooth, Ace-of-Spades shaped pure white segments, and well balanced, longish, deep peachy orange crown. 'Kingscourt,' a big trumpet of velvety texture and richest dark uniform gold, perfect in form and balance; probably the best exhibition yellow trumpet that has yet appeared. Two that I had not previously seen were an exceptionally attractive, brilliant, and well-proportioned Incomp., having very broad, smooth, flat, rich clear yellow perianth, and well-proportioned shortish deep orange-red crown. This was shown under number, and has since been named 'Cotopaxi'; it was bred from 'Penquite' by 'Killigrew.' The other, shown under the name 'Donegal,' and since renamed 'Galway,' was a most splendid large, tall, well-proportioned flower of deepest pure self gold. Registered as an Incomp., it was practically of trumpet proportion and appearance; carried on a tall strong stem, it looked as though it must be a grand garden plant, as well as a very fine show flower. Mr. RICHARDSON seemed this season to have a wealth of magnificent yellows: another that I saw amongst his exhibits was

'Gold Digger,' a large dark self golden trumpet, having a broad, flat, smooth perianth, standing squarely at right angles to the rather slender and straight-sided, neatly flanged trumpet. In one of his competitive groups I noted a most striking Incomp., named 'Jerpoint,' having very broad, slightly spoon-shaped, velvet smooth, clear golden segments. The crown, which was midway between goblet and bowl shape, was also golden yellow, with a very sharply defined ribbon edge of vivid orange-scarlet; the flower appeared to have great substance, and should be ideal for exhibition purposes.

In the Engleheart Cup class, I remember in Colonel GEORGE JOHNSTON's group a novel and most charming small crowned Leedsii, having smooth, circular, pure white perianth, and shallow coral pink eye; I have seen nothing else like this.

I was awarded the Medal for the best flower in the show for 'Murmansk,' a new and distinct flower, classed 4A on its measurement, but in appearance rather suggesting something between a white trumpet and a giant Cyclamineus hybrid. It has immense substance, and faultlessly smooth texture, the perianth being very broad, clean cut, and slightly reflexing, and the trumpet crown rather bell shaped. The flower is intense icy white, with most lovely cool green shading at the base of the segments where they join the crown at the base of the perianth tube. It is bred from 'Samite' by 'Slemish.'

When I got home from London I found many good things amongst a big batch of seedlings flowering for the first time; the most interesting break probably being a series of fine large, pale, clear greeny sulphur-lemon trumpets, bred from 'King of the North' by 'Content,' amongst them several definitely reversed bicolors. The most striking one was a large flower of fine form, having bright clear, greeny lemon perianth, with an almost white halo round the base of the segments where they join the trumpet; the outside of the trumpet was clear, greeny lemon, and the inside almost quite white, the serrated brim being most effectively tipped with sparkling lemon.

Amongst seedlings selected last year and flowering for the second time, one bred from 'White Sentinel' by 'Kanchenjunga' was very fine indeed; an enormous Leedsii of quite perfect form and good quality, having very broad, flat, smooth, pure white perianth, and large, finely frilled, perfectly bell-mouthed, milk white crown. Another tall Leedsii, bred from 'Gracious' by 'Truth,' was one of the purest self white flowers I have yet seen.

It was a good season for pink tinted crowns, and the BRODIE OF BRODIE's little 'Wild Rose' was quite astonishing here, with pure white perianth, and really rose-pink cup.

When I got to Brodie Castle, the flowers were rather past their best, and the season there had been terribly harsh, with severe and long continued drought, and nightly frosts of from 7 to 9 degrees, with brilliant sun by day, so that flowers were a good deal flagged and shrivelled, and in such poor condition that it was not possible to form a just opinion of any. There was, however, a beautiful trumpet Leedsii, named 'Scotch Rose,' of excellent form, having broad, flat, white perianth, and well flanged trumpet crown, strongly flushed warm shell pink; the BRODIE had sent a bulb to Colonel GEORGE JOHNSTON in Cornwall, in whose genial climate it had evidently shown its true character, as he enthusiastically hailed it as a great acquisition, declaring it to be even pinker than 'Wild Rose.'

GUY L. WILSON.

GRAPE GROWING WITHOUT ARTIFICIAL HEAT.

By J. WILSON.

As is fairly well known, all Grapes, except, perhaps, Muscats, can be grown satisfactorily in most parts of Great Britain without artificial heat. Of course, ripe fruit cannot be obtained early in unheated houses, but that is not important in war time, and in view of the national need for economy in the use of fuel many Fellows will wish to avoid the use of artificial heat in their vineries during the rest of the war. In the circumstances it is thought that some advice upon growing Grapes in unheated houses will be welcomed.

Houses.—Glasshouses used for the purpose of Grape growing are so varied that only a few hints of a general character are possible, and the resourcefulness and common sense of the cultivator must be relied upon to vary the methods to suit his own circumstances.

It will be an advantage if houses are as air-tight as possible and ventilators in good working order. Although structural alterations to houses are hardly possible in these times, there is one item which might pay for adjustment: if the trellis wires on which the vines are trained are nearer the roof glass than eighteen inches, it would aid the circulation of air if the wires could be lowered so as not to be any nearer to the glass than the distance specified above, provided the structure of the house allows this alteration. Provision should be made for draining the hot water system. Thoroughly cleanse both house and rods before starting the house, and do not attempt to start the vines into growth too early in the spring.

Control of Moisture and Air Circulation.—The most important factor in the successful cultivation of Grapes without artificial heat is to avoid excessive condensation by the judicious control of atmospheric moisture, endeavouring to create a gentle circulation of air, especially during the night and at the two crucial periods: (a) during flowering, and (b) during ripening of the fruit. Do not overcrowd the laterals, and to promote a free circulation of air regulate them so that only a minimum are retained for the purpose of producing the crop and perpetuating the spurs.

Temperature and Ventilation.—In order to maintain the right temperature conditions: (1) husband as much sun heat as possible by closing the ventilators early in the afternoon, at the same time giving the house a thorough damping down; (2) before retiring for the night open the top ventilators about an inch wide; (3) gradually increase this ventilation next morning as early as outside conditions allow until the maximum is reached usually about 2 P.M.

Syringing.—When weather conditions are favourable syringe the rods early in the day to encourage the buds to break, and discontinue syringing as soon as this is accomplished.

Damping.—As no artificial heat is obtainable use the utmost discretion. The frequency will depend upon outside weather conditions, but always endeavour to have the house moderately dry towards evening.

Watering.—Water the border whenever necessary, soaking it thoroughly. It is important to know whether the roots are inside the house or partly inside and partly outside, or wholly outside. A word

of warning is necessary to novices regarding the watering of vine borders. It must be realized that the border in which the roots are growing is anything from 2 to 3 feet deep and that merely wetting the top few inches is useless. In order to lessen the frequency of this operation, after the bunches have set, a mulch of strawy manure will help to conserve the moisture of the border. After watering inside the house take special care to dry out any surplus moisture as soon as possible.

Flowering Period.—Careful treatment is necessary at this stage in controlling the atmospheric moisture of the house. In order to dry the pollen if the weather be sunny, give as much ventilation as is compatible with outside conditions. About mid-day pollinate the flowers by gently drawing the hand down the embryo bunches, going from bunch to bunch. Then, on warm sunny days during this period, gently apply with a syringe a mist of tepid water to the bunches. During the flowering period it is of the utmost importance that a little ventilation should be left on all night.

Ripening Period.—At this period create a buoyant atmosphere, damping down the house only before mid-day and then only when outside conditions are favourable. Increase the ventilation when possible, a certain amount being necessary at all times. In the late autumn it is advisable to remove the bunches from the rods and place in a dry room where a minimum temperature of 45° F. can be maintained. Each bunch should be cut with a length of lateral, the cut end being inserted in a bottle of water containing a little charcoal.

Dormant Season.—As soon as the fruit is removed give the maximum amount of ventilation in order to ripen the laterals and rest the rods. A few degrees of frost is not harmful to the vines, but should severe frost threaten, close all ventilators in good time during the early afternoon in order to conserve any warmth there may be from the sun.

Other Crops.—In an established vinery where the whole of the glass is occupied by foliage it is difficult to cultivate such things as Tomatos in the house with success. Where, however, the light in the body of the house is fairly good every effort should be made during the war to produce a crop of Tomatos in addition to the Grapes.

The absence of some form of artificial heat rather restricts the variety of food crops which can be wintered in a vinery. A certain number can, however, be housed if a little extra care is exercised during the periods of severe frost by protecting the occupants with some form of covering such as hessian or even old newspapers. Lettuce and Endive which should have developed in the open garden may have their useful period extended until about Christmas if carefully transferred to the vinery. Boxes containing established seedlings of Lettuces, Cauliflowers, Broad Beans and Peas can be housed under similar conditions until such a time as they may be transferred to a frame.

Pest and Disease Control.—Two of the common troubles met with in the growing of Grapes under glass in ordinary times are Red Spider and Mildew. Owing to the absence of artificial heat there should be little likelihood of Red Spider attack provided the roots do not suffer from lack of water, but prevailing conditions rather tend to favour an outbreak of Mildew, which should be guarded against by dressing the rods with lime-sulphur when dormant, and strict attention to the control of moisture and ventilation during the growing period.

EARLY FLOWERING CHRYSANTHEMUMS AT WISLEY, 1941.

ONE hundred and twenty-five varieties of Early Flowering Chrysanthemums were grown at Wisley in 1941; of these twenty-five were grown for the first time, having been selected for trial by the Joint Committee of the Royal Horticultural Society and the National Chrysanthemum Society in 1940.

The trial was inspected by the Joint Committee on September 15 and 30, and October 15, 1941, who made their recommendations for Awards as given below. The season was somewhat abnormal, especially in the South, so the Joint Committee decided, as some varieties were not in flower on September 30, 1941, to extend to October 15, 1941, the date when an early flowering variety should be in flower.

All the varieties in the trial, with the exception of the new seedlings, were given the hot water treatment as a precaution against eelworm attack, as described in the JOURNAL, 65, p. 33.

Eelworm attack in the trial plants had been completely eradicated in the 1940 trial, but in 1941, owing to the introduction of unrooted cuttings, at a time when it was too late to subject them to the hot water treatment, twenty-three stocks were found to be infected, some of them severely. We desire to draw the attention of all growers to the effectiveness of the hot water treatment against this eelworm.

FLOWERS WHITE.

Snowfall (raised and sent by Mr. H. Shoesmith, Moor Lane, Mayford, Woking, Surrey). F.C.C. October 15, 1941, as a spray variety, for garden decoration.—Described R.H.S. JOURNAL, 64, p. 91. (A.M. 1938.)

The following varieties have been retained for future judgment: FORTUNE (Woolman), SEAGULL (Shoesmith), SUCCESS (Vinten).

FLOWERS OF YELLOW SHADES.

Marigold (raised and sent by Mr. H. Shoesmith). A.M. October 15, 1941, as a variety for garden decoration.—3 feet, of compact, bushy habit. Flower stems 18 to 24 inches long. Flowers when disbudded 4–5 inches, full centred, Tangerine Orange (H.C.C. 9) shaded with scarlet.

Yellow Star (raised and sent by Mr. H. Shoesmith). A.M. September 30, 1941, as a spray variety for garden decoration.—2 feet, of compact, bushy habit. Flower stems 7 to 9 inches long. Flowers in spray form, 3 inches, ball-like, rich golden yellow.

The following varieties have been retained for future judgment: CARADOC (Woolman), HAPPY (Woolman), HONEYDEW (Johnson).

FLOWERS OF PINK SHADES.

The following varieties have been retained for future judgment: CLAUDIUS (Woolman), GLADYS (Shoesmith).

FLOWERS OF ROSE SHADES.

The following varieties have been retained for future judgment: BERYL (Shoesmith), CÆSAR (Woolman), ETHEL (Shoesmith), DEEP PINK LEDA (Maher), LIBERTY (Lowe), SWEETHEART (Johnson).

FLOWERS OF SALMON SHADES.

The following variety has been retained for future judgment: **MARY MONA** (Shoesmith).

FLOWERS OF AMBER SHADES.

Autumn Glory (raised and sent by Messrs. J. and T. Johnson, Tibshelf, Derbyshire). **A.M.** September 30, 1941, for garden decoration.—3 feet, of compact, bushy habit. Flower stems 16 to 20 inches long. Flowers when disbudded $4\frac{1}{2}$ to 5 inches, somewhat incurved, golden buttercup yellow with a faint reddish flush.

FLOWERS OF BRONZE SHADES.

Tibshelf Glory (raised and sent by Messrs. J. and T. Johnson). **A.M.** October 15, 1941, for garden decoration.— $2\frac{1}{2}$ feet, of compact, bushy habit. Flower stems 18 inches long. Flowers when disbudded $4\frac{1}{2}$ to 5 inches, rounded, incurved, bright rich orange-bronze.

The following varieties have been retained for future judgment: **DEBONAIR** (Shoesmith), **NOMAD** (Shoesmith).

FLOWERS OF RED-BRONZE SHADES.

Chestnut Gem (sent by Mr. H. Woolman, Sandy Hill Nurseries, Shirley, Birmingham). **A.M.** September 30, 1941, as a spray variety, for garden decoration.—3 feet, of bushy habit. Flower stems 15 to 18 inches long. Flowers in spray form, $3\frac{1}{2}$ to 4 inches, rich reddish-bronze.

The following varieties have been retained for future judgment: **BASHFUL** (Woolman), **CHESTNUT GLOW** (Shoesmith), **METEOR** (Shoesmith), **SHEILA WATSON** (Lowe).

FLOWERS OF RED SHADES.

The following variety has been retained for future judgment: **LUMINOUS** (Woolman).

FLOWERS OF CRIMSON SHADES.

The following variety has been retained for future judgment: **LATERTES** (Woolman).

LILIUM MARTAGON ALBUM.

It is said that there are three Lilies that will grow in every garden—but it may take you a lifetime to find out which three they are. In my own garden, though I might have a little difficulty in deciding which were the second and third, I should have no hesitation in naming *Lilium Martagon album* as the first of the three. For some reason that I am quite unable to explain, this Lily grows so easily with me that it is almost a weed, coming up in the most unexpected places where I am quite sure it was never sown. See Fig. 103.

I had originally six bulbs. They did quite well, but were not unusually fine. More because I like sowing seed of anything that sets it than for any other reason I sowed the seed of these Lilies. The seedlings received no special care, and for this reason, perhaps, were rather slow in reaching the flowering stage. By the time they had done so the old plants had disappeared, but though I must have had some hundreds from the same stock they have always done extremely well. As seed is slow I now always propagate from scales and the little bulblets usually flower the third year.

I do not believe in coddling any plant and I think it is possible that my rather harsh treatment has resulted in the survival of the fittest, and that is why they are so healthy. The soil is sandy loam, and they appear to be equally happy in sun or shade.

(MRS.) M. J. NOEL.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1942.

Cymbidium × '**Granada**' var. '**Sunrise**.' A.M. May 19, 1942. An attractive hybrid obtained by crossing C. '**Perdita**' with C. '**Ceres**' var. '**F. J. Hanbury**.' The spike bore eight well-formed flowers, bright buff-yellow, with slight reddish suffusion and darker venation. The labellum whitish with a crimson apex. Raised and exhibited by Messrs. J. & A. McBean, Cooksbridge. See p. xli.

Delphinium '**Lorna Doone**.' A.M. June 26, 1942, as a variety for exhibition. Flower spikes somewhat tapering, $3\frac{1}{2}$ feet long, with evenly and closely spaced semi-double flowers $2\frac{1}{2}$ inches across; inner and outer petals Spectrum Blue (H.C.C. 45/3) shaded with Imperial Purple (H.C.C. 33/3); eye large, dark brown with yellow hairs. Side spikes few, strong. Raised and shown by F. A. Bishop, Esq., The Glade, Clewer Green, Windsor. See p. xliv.

Delphinium '**W. R. Chaplin**.' A.M. June 26, 1942, as a variety for exhibition. Flower spikes strong, $2\frac{1}{2}$ feet long, tapering and pyramidal in form, with evenly spaced semi-double flowers, $2\frac{1}{2}$ – $2\frac{3}{4}$ inches across; outer petals Gentian Blue (H.C.C. 42/1) shaded at the margins with Petunia Purple (H.C.C. 32/2); eye large, blackish with yellow hairs; side spikes few, strong. Raised and shown by Mr. W. R. Chaplin, Church Gate, Cheshunt. See p. xliv.

Odontioda × '**Janina**' var. '**June**.' A.M. June 16, 1942. A charming hybrid with a spike of eleven well-formed flowers displaying varying shades of mauve-pink colour. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. See p. xliv.

Odontoglossum × '**Hale**.' A.M. May 19, 1942. This distinct hybrid bore an erect spike of four large and well-formed flowers, deep-yellow with chocolate-coloured blotches and markings, the expansive labellum whitish at the base. The parents are O. '**Telemachus**' and O. '**Theo**.' Exhibited by the Stuart Low Co., Jarvis Brook. See p. xli.

Odontoglossum × **Perryanum**, **Sutherlands** var. A.M. June 16, 1942. The erect spike bore six massive flowers, the sepals and petals whitish, heavily spotted with reddish purple; the labellum has a yellow base. Exhibited by Col. E. Middleton Perry, C.B.E., Sutherlands, Wimblédon. See p. xliv.

Rhododendron × '**Clotted Cream.**' A.M. June 16, 1942, as a hardy flowering plant. A hybrid between *R. auriculatum* and *R.* × '*Neda*' (*R. discroanthum* × *R.* Cunningham's Sulphur). The leaves are long and slender, dull green above, pale below, and the truss consists of 7 to 8 flowers; the tube is long, about 2½ inches, and the lobes (of which there are occasionally six) are widely spread; the colour of the petals is deep cream (H.C.C. 503/2). The bracts at the base of the flower stalks are persistent; they are long and narrow, the pale colour darkened towards the tips by a covering of brown tomentum. Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. xlv.

Rhododendron × '**Felicity.**' A.M. May 19, 1942, as a hardy flowering plant. The flowers are wide bell shaped, 2½ inches across, evenly coloured throughout, a beautiful warm red (H.C.C. 620); the parents were *R.* × '*Radiance*' and *R.* × '*F. C. Puddle.*' Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. xli.

Rhododendron × '**Fire Flame.**' A.M. May 19, 1942, as a hardy flowering plant. This hybrid has well formed trusses of short-tubed flowers whose lobes spread widely, about 2½ inches in diameter, of a very beautiful red colour (H.C.C. 20/1); the inside of the upper petal only has darker spots. The parents were *R. apodectum* × *decorum* and *R. Griersonianum*. Shown by C. R. Scrase Dickins, Esq., Coolhurst, Horsham. See p. xli.

Rhododendron × '**Fusilier.**' F.C.C. May 19, 1942, as a hardy flowering plant. A very handsome hybrid with large trusses of brilliant red (H.C.C. 719/3) flowers; each flower is bell shaped, spreading at the mouth, 3 inches across, the inner surface of the petals faintly spotted with darker colour all over. The parents were *R. Elliottii* and *R. Griersonianum*, and the hybrid received the Award of Merit in 1938 (see R.H.S. JOURNAL, Vol. 63, p. 337). Shown by Lieut.-Colonel E. H. W. Bolitho, Trengwainton, Penzance. See p. xli.

Rhododendron × '**Panoply.**' A.M. June 16, 1942, as a hardy flowering plant. This is a hybrid between *R.* × '*G. A. Sims*' and *R. eriogynum*; the round full truss contains 14 to 15 wide funnel-shaped flowers; the tube is about 1¾ inch deep and the expanded lobes measure 3 inches across; the colour of the petals is Rose Claret (H.C.C. 021) and there is a patterning of darker spots chiefly on the upper petals. Shown by Col. Stephenson R. Clarke, Borde Hill, Haywards Heath, Sussex. See p. xlv.

Rhododendron × '**Siren.**' A.M. May 19, 1942, as a hardy flowering shrub. The bell-shaped flowers, 2½ inches across, are a brilliant red (H.C.C. 19/1) with faint darker spots on each petal; the hybrid retains the indumentum of its *arboreum* grandparent and the calyx of the *haematodes* grandparent, present in *R.* × *Choremia* which is one of the parents, the other being *R. Griersonianum*. Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, North Wales. See p. xli.

Rhododendron × '**Sunrise.**' F.C.C. May 19, 1942, as a hardy flowering plant. This very fine hybrid has blossoms nearly 4 inches across when fully expanded; the buds are deep pink (H.C.C. 21/1) and the colour pales as the flowers open till the petals become palest pink with the deeper colour retained only at the extreme base and on the outside towards the base of the tube; the flowers are of excellent substance; the plant grows quickly and forms a tall upstanding bush. Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, North Wales. See p. xli.

Rhododendron × '**Toreador.**' A.M. June 16, 1942, as a hardy

flowering plant. The flowers of this hybrid, which is a cross between *R.* × 'A. Osborn' and *R. Griersonianum*, are a dark red which changes to a brilliant scarlet when the light shines through the petals (H.C.C. 821 to 721); there are 7 to 8 flowers to each truss, each 3 inches or more across, with a wide short tube; the pedicels are dark red covered with lighter tomentum which extends up the tube of the corolla. The leaves are narrow with thick tomentum on the lower surface. Shown by Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. xlv.

Richea scoparia. A.M. June 16, 1942. *Richea* is a small genus of Epacridaceae, represented by nine species in Tasmania and one on the Australian mainland. *R. scoparia*, which was introduced to cultivation from Tasmania by Mr. H. F. Comber, is a small, much-branched, evergreen shrub the branches of which are covered with rigid, linear-lanceolate, spreading or recurved, bright green leaves. The inflorescence is a compact terminal spike. The flower has a pinkish, egg-shaped, waxy corolla about $\frac{3}{4}$ inch long, which does not open but falls to expose the essential organs. This species is figured in the *Botanical Magazine*, t. 9632 (1941). Exhibited by Colonel Stephenson R. Clarke, C.B., Borde Hill, Hayward's Heath, Sussex. See p. xliii.

Spiraea trichocarpa. A.M. June 16, 1942. A very fine deciduous shrub 4 to 6 feet high, with long arching branches. These are clothed, in the year following their production, with short, leafy twigs bearing bright green, glabrous, oblong leaves up to $2\frac{1}{2}$ inches long, and broad, rounded corymbs of pure white flowers. A very striking and distinct species introduced from Korea by E. H. Wilson in 1917. Exhibited by Dame Alice Godman, D.B.E., South Lodge, Horsham, Sussex. See p. xliii.

Styrax Hemsleyanum. F.C.C. June 16, 1942. A handsome shrub or small tree introduced to cultivation by E. H. Wilson from Szechuan. The leaves are alternate or subopposite, broad-ovate, finely toothed, from 3 to 5 inches long. The flowers are about an inch across, with five spreading white petals and ten gold-tipped stamens, and are carried in terminal and axillary eight to twenty-flowered racemes. This species is figured in the *Botanical Magazine*, t. 8339 (1910). Exhibited by Colonel Stephenson R. Clarke, C.B. See p. xliii.

Tulip 'Trinita.' A.M. May 19, 1942, as a variety for garden decoration and cutting. A well-formed, richly coloured Cottage Tulip, with a flower $3\frac{1}{2}$ inches in diameter, borne on a 21-inch stem. The shape was that of an English Breeder, but the white base was stained with blue, the remainder of the segments being Indian Lake (H.C.C. 226/1). Raised and shown by Sir Daniel Hall, K.C.B., F.R.S., V.M.H., Long Sutton House, Basingstoke. See p. xli.

Vanda lombokensis var. 'Virginia Courtauld.' F.C.C. June 16, 1942. This attractive species bore a spike of seven large flowers, the sepals and petals profusely spotted and suffused with Venetian red, the labellum rose-coloured. Exhibited by S. L. Courtauld, Esq., Eltham Hall, Eltham, S.E. 9, by whom it was collected in the island of Alor in 1938. See p. xliii.

Viola pedata bicolor alba. A.M. May 19, 1942, as a plant suitable for the alpine house. This is an attractive *Viola*, the lower petals being white (not lilac) in the variety which received the Award. Shown by W. Bentley, Esq., Quarry Wood, Burghclere, near Newbury. See p. xlii.

THE AWARD OF GARDEN MERIT.—LXVIII.

309. *DIERAMA PULCHERRIMUM.**Award of Garden Merit, October 5, 1931.*

The airy grace of *Dierama pulcherrimum* is best appreciated when a planting can be made where there is no jostling by neighbours; it certainly is not a fit subject for a crowded herbaceous border. From a clump of stiff leaves some 2 feet high are thrown up in early summer slender sprays which recurve under the light weight of seven or eight hanging racemes of tubular flowers set in membranous bracts. The flowers are very varied in colour, being usually pink to violet; good forms have been obtained by selection and a number have received varietal names; *Dierama* comes from South Africa and a well-drained soil suits it very well; though the flowering stems are so slender, they are not fragile and the roughest wind is unlikely to break them. The small round fruits that replace the flowers in autumn are not without their attraction.

Dierama resents disturbance and if it is moved great care should be taken not to break the roots; in any case it will probably take a year or more to settle down. There is an illustration in the *Botanical Magazine* t. 5555 under the name *Sparaxis pulcherrima*.

310. *CALLUNA VULGARIS* 'H. E. BEALE.'*Award of Garden Merit, April 13, 1942.*

Calluna vulgaris, the Heather of Scotland and the Ling of England, has shown a number of variations in the wild state, some of which have been introduced to gardens. The variety 'H. E. Beale,' which was found in the New Forest, is one of the best; it flowers freely, the spikes being from 8 to 10 inches long and the pale pink flowers are double, giving a full effect to the inflorescence. As with most Heaths it is best propagated by short cuttings; seeds, naturally, will not reproduce the variety true to type, even if they are produced. It makes more compact growth in a sandy, peaty soil and should not be put into heavy loam.

BOOK REVIEWS.

"Good Food in Wartime." By Ambrose Heath. 8vo. 78 pp. (Faber and Faber, London, 1942.) 3s. 6d.

A small selection from Mr. Heath's earlier books of recipes which can still be used under war-time conditions are given, with notes on possible adaptations where some of the usual ingredients are unobtainable.

"Studies of the Identification of Timbers." By Alexander L. Howard. 110 pp. Illus. (Macmillan & Co., London, 1942.) 36s.

The identification of timber can best be made from microscopical examination of its structure in cross-section. A number of treatises on the subject have given useful microphotographs but of varying magnifications so that comparison has not always been easy. In the present book microphotographs of over 550 different timbers are given, all of uniform magnification ($\times 10$). This is a most valuable and useful series, and the microphotographs are well reproduced, though it is a pity the method adopted was not a grainless one as the 'dots' of the half-tone process somewhat obscure the finer details of cell structure. The second half of the book deals with the seasoning of timber, the information given in "Timber of the World" by the same author being here revised and brought up to date.

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THE SECRETARY'S PAGE.

Subscriptions.—Fellows and Associates are reminded that if they have any friends desiring to join the Society now, a year's subscription entitles them to all the privileges of Fellowship until January 1, 1944.

Monthly Show.—Circumstances permitting, a monthly show will be held on October 6 (12 noon to 6 P.M.) and 7 (10 A.M. to 4 P.M.); the Fruit and Vegetable Show will be included in this show, schedules of which may be obtained on application to the Secretary. The monthly show planned for November 3 and 4 will be in co-operation with the British Carnation and National Chrysanthemum Societies.

Demonstrations at Wisley.—On October 7 and 8, from 2 to 4 P.M., there will be a demonstration of Digging, Trenching, Manuring and Composting in the Vegetable Garden; and on November 4 and 5 there will be a demonstration, from 2 to 4 P.M., in the Fruit Garden, on Planting Fruit Trees and Roses.

R.H.S. Gardeners' Diary, 1943.—It is hoped that copies of the R.H.S. Gardeners' Diary will be available during this month and the Secretary is prepared to book orders for it now. Last year it is feared many Fellows went without a copy as it was very quickly sold out. The selling price, including Purchase Tax, is as follows:—

In Pluviusin, with back loop and pencil—3s. 4d. post free.

In Morocco leather, with pencil (not refillable)—6s. 1d. post free.

In refillable Crocodile Case, with card and stamp pockets—11s. 1d. post free.

Refills for Crocodile Case—2s. 4d. post free.

Examinations.—Fellows will be pleased to hear that nine candidates from the Prisoner of War Camp, Stalag XX A, recently sat for the Society's General Examination (Seniors), and of these the following were successful: Private H. J. W. Day, R.S.M. H. P. Devey, L/Cpl. R. Mitchell, C.S.M. W. A. Moughton and Cpl. R. C. Stephenson. The examination was also taken in the Internee Camp, Ilag VIII; four candidates sat and the following were successful: A. E. Cottingham, J. Fitzgerald and A. Roberts.

Strawberry 'Corvallis.'—Many more applications were received for surplus plants of this variety than could possibly be supplied and it is felt that Fellows who were not successful in obtaining a supply will appreciate that there was only a limited number of plants available for distribution.

Catalogue Illustrations.—The Society has been asked by the Horticultural Trades Association to draw attention to the fact that nurserymen and seedsmen in general are proposing to eliminate from their catalogues all illustrations except upon the outside front and back covers, this step being taken in the interest of national economy.

WISLEY IN OCTOBER.

OCTOBER can be as capricious as March in the weather it brings, and in its worst moods there is little enjoyment to be had in the garden ; but St. Luke's little summer is almost sure to bring a few perfect days with genial sunshine to enliven and transform every autumn-tinted leaf. On such days all kinds of plants reveal varied, and often unsuspected, colour in their foliage and fruit, and this display is perhaps the chief attraction Wisley can offer at the present time. Unless the early autumn frosts have been unusually severe, however, the visitor may expect to find the herbaceous borders and the collections of Michaelmas Daisies, Dahlias and Chrysanthemums still worth inspection.

Before the last of the summer flowers are over there comes a series of invaluable autumn-flowering bulbous plants, to begin a succession which the Crocus species maintain almost without a break until the spring. *Amaryllis Belladonna* is one of the most desirable of these, and its rose-pink, Lily-like flowers appear now against the south wall of the Laboratory and on a bank in the Award of Merit Garden (see Fig. 112). The large, richly coloured variety *purpurea maxima* grows in the border at the foot of the Alpine meadow, where the golden, Crocus-like *Sternbergia lutea* and *Nerine Bowdenii* are also happily established. The South African Kaffir Lily, *Schizostylis coccinea*, growing in the moister parts of the Rock Garden, usually continues to flower well into November. A collection of Crocus species is planted in a bed near the Alpine house. Among those flowering now are the small purple *C. asturicus*, pale, yellow-throated *C. hadriaticus*, and the exquisite white *C. niveus*, whose prominent scarlet stigmata rival those of the Saffron Crocus.

Of the few Rock Garden plants still flowering the late Gentians are the most conspicuous, and belated flowers may still linger on some of the Campanulas and Geraniums. Two plants of more than average merit deserve mention. On the edge of the bog *Eomecon chionantha* (Fig. 105), a Chinese plant related to the Poppies, produces fleshy, heart-shaped leaves and light sprays of waxy white flowers with a grace characteristic of its family. It does not always flower as freely as might be desired, and is apt to spread beyond its allotted space ; despite these faults it is a desirable plant. Also white-flowered, and depending to some extent for effect upon its handsome, crimson-stained, palmately-lobed leaves, *Saxifraga Fortunei* comes when all other species of this genus are over, and its lacy panicles withstand the early frosts well.

In the Wild Garden several species of *Vaccinium*, particularly *V. corymbosum* and *V. virgatum*, have assumed varying shades of red,

well displayed against the green background of Rhododendrons. Stronger contrast is provided by the bold crimson leaves of the Japanese *Disanthus cercidifolius* and the fiery *Enkianthus perulatus*. *Cercidiphyllum japonicum* forms a symmetrical pyramid of salmon and rose tints, and the pale yellow of *Hamamelis japonica* is striking. There are few flowers in this part of the Gardens at the present time except *Cyclamen neapolitanum* growing happily on a bank beneath Cypresses, and *Gentiana sino-ornata* forming pools of rich colour among the *Vacciniums*.

It is to Seven Acres that the visitor must turn for the finest display of autumn colour. Here many of the berried shrubs will be at their best, and the deciduous species and hybrids of *Berberis*, such as *B. Wilsonae*, *B. Jamesiana* and *B. × rubrostilla* are festooned with fruits of many colours and forms. The Crabapples, which are one of the outstanding spring features, are almost as attractive in the autumn : the Siberian Crabs have comparatively large, red fruits and *Malus Sargentii*, *M. Zumi* and *M. theifera* have smaller, but equally bright, clusters. *Pyracantha Rogersiana*, varying from deep red to clear yellow, is always conspicuous. The several *Euonymus* species are ornamental in leaf as well as in fruit, *E. alatus* being particularly charming. Coloured foliage is in evidence everywhere : *Phellodendron amurense* in clear yellow, *Rhus cotinoides* in orange and scarlet, *Acer Ginnala* and *A. circinatum* are all very bright, the Aronias give a vivid, though fleeting, splash of crimson, and the older leaves of *Hypericum patulum*, passing gradually to red and bronze, contrast effectively with the green shoot-tips.

In Howard's Field the Rose species are the chief attraction. An inspection of this large and varied collection will give an idea of the great value of these plants even on the poorest soils. *R. multibracteata*, *R. nutkana*, *R. Soulieana* and *R. virginiana* are but a few of those in good condition during the present month ; many are decorative until the end of the year.

In the greenhouses there are, as usual, some interesting plants in flower. At the end of the Half-hardy house the red and yellow hybrid Abutilons form a leafy, flower-decked screen, and the tall-climbing *Calceolaria Pavonii* continues to produce its quaint yellow blossoms. *Acidanthera bicolor* var. *Murielae*, with erect spikes of white, Gladiolus-like flowers, finds the conditions here much to its liking. One of the most valuable plants in the house is *Lithospermum rosmarinifolium*, which, coming into flower late in October, blooms continuously all the winter. Nearby, in the Temperate house, the advance of autumn is indicated by the flowering of the earliest Acacia, *A. platyptera*, and *Camellia Sasanqua*, with large, single flowers of palest pink. *Plumbago capensis* and *Hibiscus Waimeae* are still flowering ; the last-named showing a suffusion of rose over its white petals as its season ends.

THE WAR-TIME KITCHEN GARDEN.

OCTOBER.

Digging and Trenching.—One of the most important operations in gardening is the digging of the soil ; not only is thorough digging necessary when grassland is being converted to vegetable growing for the first time, but it is essential that every bit of the garden should be dug over at regular intervals. The object of digging soil is to

render it more open so that air and water can circulate freely ; drainage is improved and the temperature raised ; stiff, unbroken clay is a cold soil. During the process opportunity can be taken of digging in extra materials with a view to improving the texture, of adding extra food material and of counteracting undue acidity or alkalinity if present. It is generally recommended that new ground should be dug two spits deep, but the depth depends on the character of the soil. By a shallow soil is meant one where there is a hard layer either of rock, stiff clay or gravel not far from the surface ; shallow soils are very dry in hot weather, but may become water-logged in the winter owing to the bad drainage. To overcome these disadvantages, whenever possible the lower layer should be broken up to improve the drainage, but it should not be brought up so as to replace the surface layers as it will be infertile and unsuitable for cropping for some time to come.

The desirability of growing as many vegetables as possible is being more generally realized, and if it is proposed to take in a greater area from the flower garden, or if new ground has been acquired, the present is an appropriate time to get the digging done.

There are various methods of digging, the most thorough being that known as bastard trenching or double digging ; in this the top spit is broken up and turned, whilst the subsoil is broken up but not removed. The work should be done systematically ; the plot to be dug should be divided in two lengthwise ; it is then dug down one side and up the other. Consider first ground that is covered with grass : a strip some 24 inches wide is marked out half-way across the plot ; the grass is removed about 2 inches deep and a trench dug the depth of a spade ; the grass and soil removed is piled opposite the other half of the plot at the same end where digging will finish and where it will be required to fill in the last trench. The subsoil uncovered is then thoroughly broken with a fork. The next strip of the same width then has the grass removed ; the turves are laid face down over the subsoil of the first trench, chopped up with the spade and covered by top soil from the second strip. Proceeding in this way, strip by strip, the level of the plot as a whole can be maintained. The surface of the soil can be left rough so that it can be freely acted on by frost and winter rains. If the turf has been of reasonably good quality no manure will be necessary for the first year, and it will be excellent for Potatos or green crops.

If the ground to be dug has already been under cultivation, the same method of bastard trenching can be used, if necessary, but there will be no surface grass to remove. The soil may, however, need some feeding, in which case organic manure—animal or from the compost heap—should be incorporated ; this is put over the subsoil after forking and covered by or mixed with the top soil. To ensure even distribution the manure should be spread over the whole area and the amount covering one strip laid over the subsoil of the preceding trench before the top soil it has been covering is turned over it.

Where ground has already been well prepared for previous crops, such deep digging is not essential ; single digging is sufficient, the top spit being thoroughly turned and broken up to the full depth of a spade. This digging should be carried out as the ground becomes available by the clearing off of the various crops.

Land that has been under cultivation for some years may be richer in the subsoil than in the top soil ; the food material in the upper

layer tends to be exhausted and various pests and diseases will be present ; in this case it would pay to practise true trenching in which the subsoil, instead of being merely broken up, is brought to the top and the top soil placed beneath it. This is done by removing the soil to a depth of two spits, then filling this trench first with the top spit of the second strip and then with the second layer, which thus becomes the upper one, and so on.

Work to be done.—Potatos should be lifted and stored ; Beet, Carrots (sown before July) and Turnips (sown in August) may also be lifted for storing now. August-sown Cabbage plants can still be planted out. Winter Lettuces should be thinned to 3 inches apart ; Leeks and Celery need earthing up. The vegetable garden should be thoroughly tidied so that no decaying matter is left about, all suitable refuse being put on the compost heap, but Cabbage stalks should be burned as a precaution against Cabbage Root Gall.

Frames.—This is the best time to sow Lettuces to mature early in spring, a suitable variety being chosen. Cauliflowers sown in September should now be removed to frames and planted about 4 inches apart each way ; they need as much air as possible, but must be protected from frost. Endives sown in August can now be transferred to frames for protection ready for blanching.

Crops available from the Garden in October.—Brussels Sprouts, Cabbages, Cauliflowers, Lettuce, Runner Beans, Spinach Beet, Winter Spinach.

The Fruit Garden.—In last month's notes the picking of Apples was dealt with, and briefly the advice about late keeping varieties was (1) to leave the fruit on the tree as long as possible ; (2) to pick the fruit only when it came off according to the prescribed test ; (3) to put aside all damaged fruit and also those without a stalk for immediate use ; (4) to store only perfectly sound fruit ; (5) to grade the fruit into sizes on the trays or shelves ; (6) to place the fruit in a cool, airy, moist room or shed until it had finished " sweating."

The period of " sweating " takes anything up to a fortnight from the time of picking, and when the skin has become dry wrap the fruit in the thin oiled paper wraps which should have been kept from last year. These special wraps are now more or less unobtainable and if there are none available use soft tissue paper, or failing that soft clean newspaper. Newspaper may stain the skin a little. Wrapped fruits will keep better than those which are not wrapped, and added to that the paper prevents the spread of disease in the store. The wrapped fruits are placed on the shelves or trays two or three layers deep, never more. Failing shelves pack three layers deep in wooden boxes.

A good natural store is one wherein the atmosphere can be kept moist without becoming stagnant, where an even temperature of round about 42° F. can be maintained—the lower the temperature the better the fruit will keep—and where ventilation can be provided. Free ventilation is given for a fortnight to three weeks after putting the fruit in store, but after this period reduce the ventilation, maintaining as still an atmosphere as possible. A cellar or underground room will often conform to the conditions described, and it may be possible to convert a room or outhouse to meet the required conditions. Failing these storage places pack the fruit into wooden boxes, and stand the boxes on bricks or boards in a cool part of the garden ; cover with straw and thatch ; this not only keeps the rain out but prevents fluctuations of temperature. As an alternative the boxes can be stood in a shed,

but they must be covered to prevent rapid changes in temperature. Pears, if possible, should be stored indoors and given a slightly higher temperature—about 45° F. is the ideal. Both Apples and Pears in store should be periodically looked over. This applies particularly to Pears which ripen quickly.

Prune cultivated Blackberries as soon as the last of the fruit has been picked. The old fruiting canes are cut out, to be replaced on the support by tying in the new canes. If further plants of Blackberries are wanted, bury the tips of the new canes a few inches in the soil. The tips will root and can be cut off the cane next spring to form new plants.

Plums, Peaches, and other stone fruits which are growing too strongly should be root pruned now. Dig a trench 3 feet out from the stem right around the tree and cut back all the coarse roots, taking care not to injure the fibrous roots. Fill in the trench and make firm. If some mortar rubble is available give a dressing of this material. Trees older than twelve years should only have one half of the roots pruned this year and the other half next year; this is done to avoid too severe a check.

HESPERALOE PARVIFLORA.

By the Rev. Professor E. S. LYTEL.

Hesperaloe parviflora of Coulter has been by other botanists named *H. yuccaefolia*, *Aloe yuccaefolia*, *Yucca parviflora*, and *Y. parvifolia*. It is a native of S.W. Texas.

In outward appearance it closely resembles a *Yucca*, with evergreen tufts of upright spiky foliage. The leaves are narrow and concave, green tinged with purple and edged with whitish hairs. The tuft may reach 2½ feet or more. The branching flower spike may reach 4 feet. The nodding flowers are not so open and bell-shaped as in *Yucca*, but rather more narrow and tubular. There is a form with more bell-shaped flowers distinguished as var. *Engelmannii*; this is sometimes given specific rank, and is figured in the *Botanical Magazine*, t. 7723, as *Hesperaloe Engelmannii*.

The chief distinction in appearance from *Yucca* is in the colour of the flowers. Instead of being creamy white they are a striking Tomato red.

At Nyewoods I have only two young plants, but on the rock garden at Hillier's nursery, Winchester, there is an adult specimen which is now (late July) in full bloom. It is thought to be var. *Engelmannii*, but I have no means of comparing it with the type. In any case it is most attractive.

Apparently it is fairly hardy; on an open rock garden, without any protection, it has survived uninjured the last two severe winters. It of course needs, like *Yucca*, sun and quick drainage. The flowering tuft may possibly perish, but Hillier's plant is sending up side-shoots, so it is likely to be perennial.

The seed from which this plant was raised was collected in Arizona at a fairly high altitude where it was subjected to considerable frost and snow.

To me this plant deserves high marks, and it should appeal to those who like a plant which is not only unusual but is also beautiful and not exacting in its cultural needs.

SIR DANIEL HALL.

1864-1942.

ALFRED DANIEL HALL has been acclaimed by many writers as an eminent scientist and agriculturist, but few have recognized sufficiently his great knowledge of and interest in horticulture. Sir DANIEL always maintained that as a boy at Rochdale (Lancs.) his first interest was in gardening and in exhibiting flowers and vegetables at the local show. He was a member of the Rochdale Gooseberry Club and often competed on club nights. Little is known of these Gooseberry Clubs, for they are seldom found outside Lancashire, and Sir DANIEL enjoyed explaining their working. On club nights each member with his largest berries hidden from sight in a basket took his place at the table. The berries were weighed in a pair of scales, placed in front of the Chairman, and his was the task of proclaiming the weight of the berries. The proceedings took time, for the largest berries were produced only as the weights mounted. In the North amateurs took a hand in breeding seedlings in the hope of producing giant berries, and one member, Dan, had many such seedlings to his credit and won many prizes. Dan however thought poorly of one seedling which he gave to a fellow member, under whose care it grew and flourished and produced such giant berries that Dan had now to take second place. The fellow member named this berry 'Dan's Mistake,' by which name it is known to this day and by which name Sir DANIEL introduced it to the fruit trials at Wisley to remind him of his boyhood connection with horticulture.

At the S.E. Agricultural College, Wye, Sir DANIEL was brought into contact with the fruit industry, and particularly with the Cherries and Apples for which that part of Kent has long been famous. In those days the 'Ribstone Pippin' and the 'Blenheim Orange' were the leading Apples for dessert, whilst the 'Wellington' was outstanding for pies and dumplings. These remained Sir DANIEL's favourites to the end and at Christmas time he often asked me to get him a bushel of 'Blenheims' (off grass) and a bushel of 'Wellingtons.' He thought highly too of the Russet flavour and deplored the fact that these had passed out of cultivation.

Sir DANIEL's attitude to fruit is well expressed in his book *The Apple*, where he says: "Putting aside any patriotic self-deception, the good English dessert apples—Cox's Orange, Blenheim Orange, Ribstone Pippin, James Grieve—are superior to any imported apple. As for cooking apples the supremacy of the English sorts either for baking or in a pie is merely a question of whether or not you have any taste in such matters." Sir DANIEL had taste and he preferred the 'Blenheim' for baking and the 'Wellington' for pie. He was conscious of defects in our orchards, for, as he says, "Much English apple-growing has not yet outgrown two bad influences in its parentage—the private garden, which has cluttered us up with an excess of varieties and methods of management that are heedless of expense, and at the other end of the scale the grass grown farm orchard. Far too many of these old orchards still persist—vegetable 'slums,' the outcome of careless planning and continued neglect, like the human slums of our

great towns. When you let apples or anything else grow 'as God wills' the devil has full play."

He was fond of flowers but in a special way. He expected form and perfect shape, but could not tolerate doubles. He wrote: "The doubling of a flower is always a doubtful blessing, but to double an early tulip is to destroy the finest and most distinctive qualities that it should possess. It may be agreed that double tulips are more lasting, but it is no gain that a nightmare should endure for two nights instead of one. Were permanence the great value, flowers might be made of pottery and enamelled iron." He wrote pages on Parrot Tulips, Darwin Tulips, etc., but dismissed the class of Late Double Tulips in two words: "Better dead." The older he grew the more intolerant he became of doubles.

Sir DANIEL'S attitude to flowers was that of a fancier. He was attracted less by the display than by the form and shape of the blooms and their purity of colour and markings. That was probably why he was attracted to the English Florist's Tulip where an ideal shape, form and purity of base colour were accepted. The shape of a claret cup, rounded petals, and the base and filaments to be free from any trace of blue were canons faithfully observed, yet he was generous enough to recognize other points of view. He writes: "Why confine a flower within the artificial limits of the florist's canon, why not judge it on its merits for its beauty alone? Many people admire 'a sweet disorder in dress,' and prefer the wild flaunting irregularity of many of the Cottage tulips to the ordered symmetry of a Florist's tulip. This is a romantic age, impatient of line and rule, but romanticism easily degenerates into sloppiness, and there are signs of a return to a more hard and fast judgment, even of flowers."

He was fond of Roses and many other flowers, but favoured varieties had to have the purity of form and colour as in his favourite English Tulip.

His only departure from this seems to me in connection with Parrot Tulips, for of these he writes: "The proper place for Parrot tulips is a formal bed on a lawn that is sheltered and yet fully exposed to the sun. The colours should be mixed and they should be planted closely; if the season is favourable the beds will make the most glowing display of sparkling colour." This is his only reference to his liking for the display.

Sir DANIEL'S services to horticulture were numerous and it would be idle to chronicle these in any sort of order. His books of *The Soil* and *Fertilisers and Manures* have been widely used by all cultivators of the soil for both agriculture and horticulture crops. These are standard books of great value. His book of *The Tulip*, published in 1929, is a standard book of the highest class. It is the work of a master of writing and a master of knowledge, for every page contains the simple truth, without exaggeration, of Tulips and their cultivation, drawn from the direct experience of the writer in growing these crops in his garden. His writings are so appreciated because the structure has been built from personal experience and not copied from others.

One example of the Parrot Tulip has already been given; here is one on the Darwin: "The outstanding excellence of the Darwins lies in their stout stems, size and substance, which make of them suitable features for garden decoration and enable them to stand up to rough winds, hail and other vagaries of an English May." This is truth without exaggeration.

Finally, in 1940, he gave to horticulture his most scientific book on the subject—*The Genus Tulipa*—beautifully illustrated by Osterstock, and much more would have been heard of this but for the war. Its use will live on and its value increase with time.

His other services to horticulture have been given through the official posts held. As Principal of the South Eastern Agricultural College, Wye, 1894–1902, he attracted the interest of the Fruit and Hop Growers and made them realize their industries could be improved by applying science to practice. This prepared the grower for the application of scientific research to fruit-growing which has come since. As Development Commissioner, 1909–17, he was able to lay the foundations for Horticultural Research Stations—East Malling and Long Ashton—and finally as Chief Scientific Adviser to the Ministry of Agriculture to plan for their expansion. Finally, as Principal of the John Innes Horticultural Institution he brought the highly specialized work of that Institution sharply to our notice; horticulturists are now familiar with chromosomes, triploids and diploids, etc., and of the practical application of this work in horticulture.

For many years he had assisted the Royal Horticultural Society in its activities as a Fellow, as Judge of Tulips, and for nine years as a Member of Council. Finally, in 1939, as a bit of war work he undertook the task of Editor of the Society's publications, and discharged this new and last task with great distinction.

Great was his interest in horticulture and numerous were the ways by which he helped members of the Society and other horticulturists. He will long be remembered for his services to horticulture and, by horticulturists, for the assistance he has given them.

H. V. TAYLOR.

PAEONIA MLOKOSEWITCHII.

(Fig. 107.)

By A. T. JOHNSON.

ALTHOUGH this superbly beautiful Paeony may not be one of the easiest of plants in a general way it does not seem to have made that progress in gardens to which its unique charm and distinction entitle it. A fairly recent introduction from the Caucasus region, the Paeony with the unpronounceable name must be placed high among the *élite* of its distinguished family. If some have found it anything but tractable in cultivation, with others it is as responding as any other. It is absolutely hardy, even the young shoots, which appear early, being indifferent to light spring frost, and it has been known to flourish in a stiff clay. We have it in both a friable, sharply-drained soil, rather dry in summer, and where the root-run is cooler and stiffer, the former conditions appearing with us to be the more favourable. Light shade is provided by overhead branches, partly with the purpose of warding off late frosts and partly so that the flowers will last longer, a precaution desirable with most Paeonies.

A well-established plant of *P. Mlokosewitchii* may present a compact mound of growth five or six feet in width and two feet or more in height. The red shoots of spring develop into a broad-leaved

foliage of a bluish green, often red-stained on leaf-ribs and stems, and the flowers which follow, standing clear above the leaves, are freely produced in late April and May. The incurved bright citron-yellow petals, broad and firm in texture, have a spread of at least six inches, and at their centre is a bold wreath of orange anthers. These lovely blossoms, perhaps more appealing than those of any other Paeony, are succeeded by seed pods which, on opening in early autumn, each display a double row of glossy blue-black seeds with about an equal number of sterile ovules in a brilliant red.

This Caucasian seems to possess little affinity with the general run of Asiatic and European species, a peculiarity which has, I believe, led to difficulty in obtaining hybrids between it and any save its nearer allies, of which *P. tenuifolia* is one. Nor need this be a matter for regret with the average lover of good plants who finds *P. Mlokosewitschii* an object of such perfection that he asks nothing better.

CALLUNA VULGARIS VAR. HIEMALIS.

(Fig. 106.)

By A. T. JOHNSON.

WHEN we were in the south of France a few years ago we found near Hyères in mid-January a colony of *Calluna vulgaris* in full bloom, the flower spikes being fresh and many of them still in the bud stage. In view of the latitude and local conditions there was perhaps nothing surprising in this, especially in the case of a plant so adaptable and widely dispersed as this Heath. With little confidence in the possibility of it permanently retaining its mid-winter flowering properties in our Welsh garden we brought home some cuttings. These soon made nice lusty specimens and they have not shown the slightest inclination to revert to what we here regard as the normal flowering season of the species. It is usually late November before the first blooms open, the spikes being full towards Christmas, the accompanying photograph of a part of a group in this garden having been taken on December 20 of last year.

To anyone interested in Heaths *Calluna vulgaris* var. *hiemalis*, as it has been called, should be a valuable plant, for its flowering occurs after the autumn bloomers have ceased and before most of the winter varieties are at their best. In growth it is vigorous, erect and compact, with the characteristic foliage of the type and a height of eighteen to twenty-four inches. The leading flowering spikes, slender and finely tapered, are a clear bluish lilac, closely packed with blossoms, fragrant and yielded with the utmost profusion. They are about nine inches long and liberally provided with flowering laterals reaching to about half their height. In hardiness and general culture this southerner does not differ materially from the British native and its varieties, and if its flowers are apt to be affected by frost they are surprisingly immune to all but severe visitations.

HOEING.

By DR. B. A. KEEN, F.R.S.

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FOR the past fifteen years or so, experiments on the effects of cultivation on farm crops have been made by Rothamsted with unexpected but consistent results. The results were unexpected because the experiments were begun in the full belief that they would confirm the widely held tradition that good yields were dependent upon thorough cultivations. It was the consistent refusal of the experimental results to support this thesis that forced us to examine it critically with special reference to its origin.

In the first place a summary of our experimental results may be given. The full accounts have appeared in numerous papers in the *Journal of Agricultural Science* and elsewhere. Except where otherwise stated, the experiments were done on the Rothamsted soil, a stony, heavy loam soil with a clay subsoil.

Subsoiling gave no increase in the yield of the Sugar Beet crop, even when the subsoil was thoroughly broken up with forks, as in the garden operation of trenching.

An extra ploughing, corresponding with a second digging in garden practice, was also without significant effect. The same conclusion applied to deep ploughing; the depth of tilth was not important provided it was reasonably weed-free.

The longest series of experiments was done on hoeing and on the inter-row cultivation of root crops and has provided some very definite results. As the conclusions therefrom have aroused mingled approval and condemnation among horticulturists and gardeners they will be discussed in more detail.

The first series consisted of four experiments on Sugar Beet, three at Rothamsted and one on a light sandy loam at Woburn. The comparison was between the number of inter-row hoeings needed in the particular season (decision on this being left to the skilled farm staff) and a larger number of hoeings whose dates were also chosen in accordance with weather and soil conditions. Thus, both the number of normal and extra hoeings varied from season to season, but each of them would have been approved by any believer in frequent cultivations. The results are given in Table I.

TABLE I.—*Effect of Intensive Inter-Row Cultivation on Sugar Beet.*

Year and Place.	Normal.		Intensive.		Gain or Loss by Intensive Cultivation. Tons per Acre.	
	Number of Cultivations	Yield. Tons per Acre.	Number of Cultivations.	Yield. Tons per Acre.	Gain.	Loss.
Rothamsted						
1932	3	14.0	8	13.0	—	1.0
1934	2	16.3	8	14.5	—	1.8
1935	3	11.4	8	11.7	0.3	—
Woburn						
1932	5	12.0	8	11.8	—	0.2

Only in 1935, at Rothamsted, did the extra cultivations produce any increase of yield, and that was quite insignificant. In the remaining three experiments extra hoeing produced an insignificant depression at Woburn in 1932, and two unmistakable reductions at Rothamsted in 1932 and 1934. The results show that extra cultivations are not only wasted labour at the best, but may cause an actual loss of yield.

A separate experiment on Kale in 1932 showed that extra cultivations produced a drop in yield of nearly two tons on an average yield of 25.5 tons per acre.

Hence, for Sugar Beet grown under farm conditions, the minimum number of hoeings rather than the maximum is sound practice.

In the three years 1937-9, a comprehensive series of experiments on Potato cultivation was carried out by Dr. H. C. PEREIRA in conjunction with Rothamsted. The soil was a light loam in a commercial Potato growing district in Surrey. The experiments were designed to show whether inter-row cultivation had any effects beyond the destruction of weeds. There were three main cultivation treatments:

N. Ridging-up to a height of 6 ins. with two preliminary grubblings to destroy weeds and to provide enough loose soil to make the ridges.

E. As in N, but with 2-4 extra preliminary grubblings.

U. No grubblings, the soil unstirred and left flat, weeds being removed by hand or by a very shallow surface scraping.

The results are shown in Table II.

TABLE II.—*Effect of Inter-Row Cultivation on Potatoes.*
Yields in Tons per Acre.

Treatment.	E.	N.	U.	Standard Error.
1937	12.36	10.37	12.33	0.59
1938	8.82	8.80	8.63	0.32
1939	10.75	10.99	11.79	0.50

This table shows at a glance that in each of the three years the intensive cultivation treatment, E, was no better than treatment U, which had no ridging and a mere surface scraping; indeed, in 1939, the U treatment produced a 10 per cent. increase over the E treatment. In comparison with the N, or normal cultivation, the intensive cultivations were without effect in the second and third years, but were definitely better in the first year, when the normal cultivation showed a drop of two tons below both the E and U cultivations. The probable reason for this drop was noted at the time: there were a number of small weeds on the N plots in the early part of the season in spite of the two grubblings. The suggestion that a relatively slight weed competition in the early stages of crop growth might appreciably affect the yield was made the subject of further experiments, referred to later in this article.

These Potato experiments showed that weed destruction rather than the method of destruction was the crucial matter, for no extra benefit was secured by the inter-row grubbing and the ridging. Indeed, except for the fact that high ridges are necessary for existing types of sprayers, and of spinners for harvesting, there seems no reason why

Potatoes should not be grown on the flat, which would save much of the labour of cultivations. Certainly for garden and allotment practice the alternative is well worth considering. Four reasons against the proposal will probably be advanced: that ridges improve the yield, increase the percentage of ware tubers, decrease the percentage of greened tubers, and reduce the risk of the tubers being affected by spores of the Potato Blight. The first three were all disproved by the Potato experiments just discussed, while the fourth, although widely recommended, seems to rest on faith rather than on experimental proof. The soil for the ridges must be taken from between the rows; hence, although spores falling on the upper part of the slope have to pass through a greater depth of soil before reaching the tubers, those falling on the lower part of the slope have a correspondingly less distance to travel. Ridging, therefore, may be an illusory precaution except for those heavier soils that crack on drying. Spores would be easily carried into the soil down these cracks, and in such cases the loose uncracked mould of a ridge may well be an advantage.

The possibility that weed competition in the early stages of crop growth appreciably affected the yield was further examined by experiments on Sugar Beet made in 1939-41 on the light land at Woburn. The general plan of the experiments in the 1939 and 1940 seasons was the same. One-half of the total number of plots received the normal cultivation appropriate to the season, the other half received an extra cultivation around singling time, which corresponds to the final thinning in garden practice. All the plots received phosphate and potash manures; in addition half the plots received a good dressing of nitrogenous fertilizer and the remainder a smaller dressing. Thus the effects of the two types of cultivation could be measured at two different levels of fertility. The results are shown in Table III.

TABLE III.—*Effect of Early Cultivations on Sugar Beet.
Yields of Roots in Tons per Acre.*

1939.			1940.		
	Low N.	High N.		Low N.	High N.
Normal C. . .	7.6	11.9	Normal C. . .	13.4	21.1
Extra C. . .	9.6	13.5	Extra C. . .	16.1	20.5
Difference .	2.0	1.6	Difference .	2.7	-0.6
Extra cultivation: hoed a week before singling.			Extra cultivation: hoed a week after singling; two hoeings in late August.		

The results show that in 1939, which was a low to average Sugar Beet year, the one extra hoeing at singling produced a marked increase in yield on the low nitrogen plots, and a slightly smaller increase on the high nitrogen plots. In 1940, when higher yields than 1939 were common, the same result was obtained on the low nitrogen plots, but on the high nitrogen plots a small decrease was given. The two extra hoeings in late August can have had little additional effect, for a marked increase in the size of the tops—a consequence of the early hoeing—had become apparent before that time.

For land in moderate or low fertility the 1939 experiment showed the advantage of a hoeing before singling, and the 1940 experiment showed the value of a post-singling hoeing.

In the 1941 experiment pre- and post-singling hoeings were tested separately and together, again at two levels of fertility. The results are given in Table IV.

TABLE IV.—*Effect of Pre- and Post-Singling Hoeings on Sugar Beet.*
Yield of Roots in Tons per Acre.

Hoeing.	Low N.	High N.
Shortly before singling . . .	10.09	14.09
Shortly after singling . . .	9.15	13.89
Shortly before and after singling .	11.27	13.37

Taking the low fertility series first, it is clear that the pre-singling hoeing is more efficacious than the post-singling one, and that the best result is secured when both hoeings are done. On the high fertility plots there is little to choose between pre- and post-singling hoeing, while both together give less yield than either alone, a result which is the opposite to that obtained on the low fertility plots.

The 1939-41 experiments dealt with early hoeing and the 1932-35 ones with later hoeings. The simplest explanations covering both sets of results are that late hoeings were either without effect or definitely harmful; that hoeings around singling time were beneficial if the land was in low fertility; and that the higher the final yield is going to be, for manuring or climatic reasons, or both, the less will be the beneficial effect of early hoeing.

Although few, if any, cultivation experiments have been made in Great Britain, except those conducted by Rothamsted, in the United States a very large number has been made over a long period of years. These were almost completely ignored in this country, possibly because it was felt that their results must be inapplicable to our own climate and soil conditions, in which it was tacitly assumed that correct and detailed cultivations were essential. As the validity of that assumption is, at the lowest estimate, shaken by the Rothamsted results, a comparison of the American findings with our own is of interest. We may take a large set of standardized trials made in twenty-eight States on soils that varied from light sands to stiff clays. The sites ranged from the coast to the central plains and thus included a wide difference of climate. The crop was Maize, and the comparison was between the normal inter-plant cultivation and a mere surface scraping to remove weeds. Both the yields of grain and of fodder (stalks and leaves) were measured. The results are shown in Table V (see p. 327).

The two treatments fluctuate in their relative advantage, but the overall difference between them is insignificant both for grain and fodder. The explanation of this result is essentially the same as that for our own experiments: that the primary purpose of hoeing is the destruction of weeds which compete with the crop for water and nutrients, and that the mulch of loose soil produced by hoeing is an incidental accompaniment and not its main purpose. The explanation is thus in opposition to the traditional belief, which ascribed much

virtue to the mulch, and fortified itself by an appeal to the capillary-tube theory of water ascent in soil: the pore-space behaved as a bundle of capillary tubes up which water would rise by capillarity from a saturated zone below, and be continually lost by evaporation at the soil surface but for the destruction of the upper ends of the capillary tubes by the action of hoeing, which thus prevented the water from rising further than the bottom of the mulch. It was perhaps unfortunate that so simple a theory, which gave the practical man convincing explanations of hoeing, rolling, and other cultivation operations, should have been found by later research to be quite inapplicable to the movement of water in soil. But such was the case, and it meant that the traditions of cultivation required critical review in the light of the new knowledge.

TABLE V.—*The Effect of Cultivation and of Surface Scraping on the Yield of Maize. (United States.)*

Year.	Grain.		Fodder.	
	Number of Experiments.	Average Yield of Scraped, as percentage of Cultivated Plots.	Number of Experiments.	Average Yield of Scraped, as percentage of Cultivated Plots.
1905 + 6	5	108.4	3	96.36
1907	8	110.84	2	91.6
1908	6	97.93	4	94.95
1909	25	105.27	10	101.15
1910	43	96.51	19	96.19
1911	25	92.37	15	91.24
Weighted means	(112 expts.)	99.108	(53 expts.)	95.1

This is not the place to explain the correct theory of water movement in soil, which has already been set out in the *Journal of Agricultural Science* and elsewhere. It is sufficient for the present purpose to point out that the theory permits far less freedom of movement to the soil-water than the capillary theory did. The water, in fact, resists movement: in the expressive American idiom, it tends to "stay put." The plant roots go to the water, not the water to the roots. Similarly, when drying conditions set in, causing evaporation of water at the soil surface, the water does not move up from below to replace that loss as it should on the capillary tube theory. What actually happens is a progressive drying out of the soil from the surface downwards: the thickness of the dried layer increases, but immediately below the layer the soil moisture remains substantially unaffected in amount, until it evaporates in its turn. In other words, soils are "self-mulching," as may easily be seen by cutting a trench in bare soil after a dry spell and noting the sharp line of demarcation between the top dry layer and the moist soil immediately below.

Hoeing, therefore, merely produces mechanically what will happen naturally; it is not a direct moisture-conserving operation. The value of hoeing, apart from the really important one of weed destruction, is that it will counteract the tendency of heavy soils to form a hard dry crust or cap, and to form deep cracks through which water from

the lower depths is easily lost by evaporation. For this purpose the operation must be done at the right time, when the soil is just moist enough to crumble easily under the action of the hoe.

The writer is well aware that most readers, especially those who may be convinced by the facts here given, will wonder why the traditions are so widely held. The answer is to be found in the history of cultivation practices. They grew up and their traditions were established during the old three-field system of agriculture that lasted for many hundreds of years in England, and is still found, in essence, over much of Europe. Under this system, with its rotation of cereal crops and fallow, the land was necessarily very weedy. Cultivation implements were clumsy and inefficient, so, to deal with weeds, the farmer had to cultivate as often as the agricultural system permitted. The cost of the extra work was negligible, for his draught oxen or horses had to be kept and fed all the year round and there was abundant cheap human labour.

Even when the technical conditions of agriculture were vastly improved by the four-course rotation and the efficient implements due to the Industrial Revolution, the horse still remained, and thus there was no fundamental change in the economics of cultivation. Therefore the practice could be, and was, carried on, and its continuance was made easy by the force of the tradition inherited from the conditions of the three-field system. This situation extended into our own time, and, naturally, the tradition survived also.

The coming of the tractor has made a fundamental difference: every time it is used for a cultivation there is a direct money cost for the fuel and oil used. Unlike the horse, it costs nothing when it is idle. The tractor-farmer's interest lies in keeping his cultivations down to the very minimum consistent with good farming. As economics and the scientific examination of the existing traditions both pull in the same direction, there is hope that we shall be able to build up a new standard of good cultivation.

Although the economic conditions of farming do not apply with the same force to horticulture and gardening, nothing will be lost in substituting a new and an informed standard of proper cultivation in place of traditions which, because they grew up in totally different circumstances, contain a confused mixture of truths and untruths.

The experiments described above by Dr. Keen have been conducted on an agricultural scale and gardeners may feel that the results are not entirely applicable to horticulture. Comments will be welcomed and especially accounts of any trials that have been made on a horticultural scale.—ED.

ROSE PRUNING.

By W. SLINGER.

IN the July issue of the JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY appeared an article under the heading of "The Science of Growing Roses." I am afraid much of the advice given in this article has not the backing of many, if any, experts, and if taken seriously will land many Rose lovers anxious to get the best out of their gardens into difficulties. Mr. BRADFORD's main attack is on severe pruning, and he states "the beautiful flowers we see at the shows are grown by pruning the trees so hard that the new growths are restricted to one

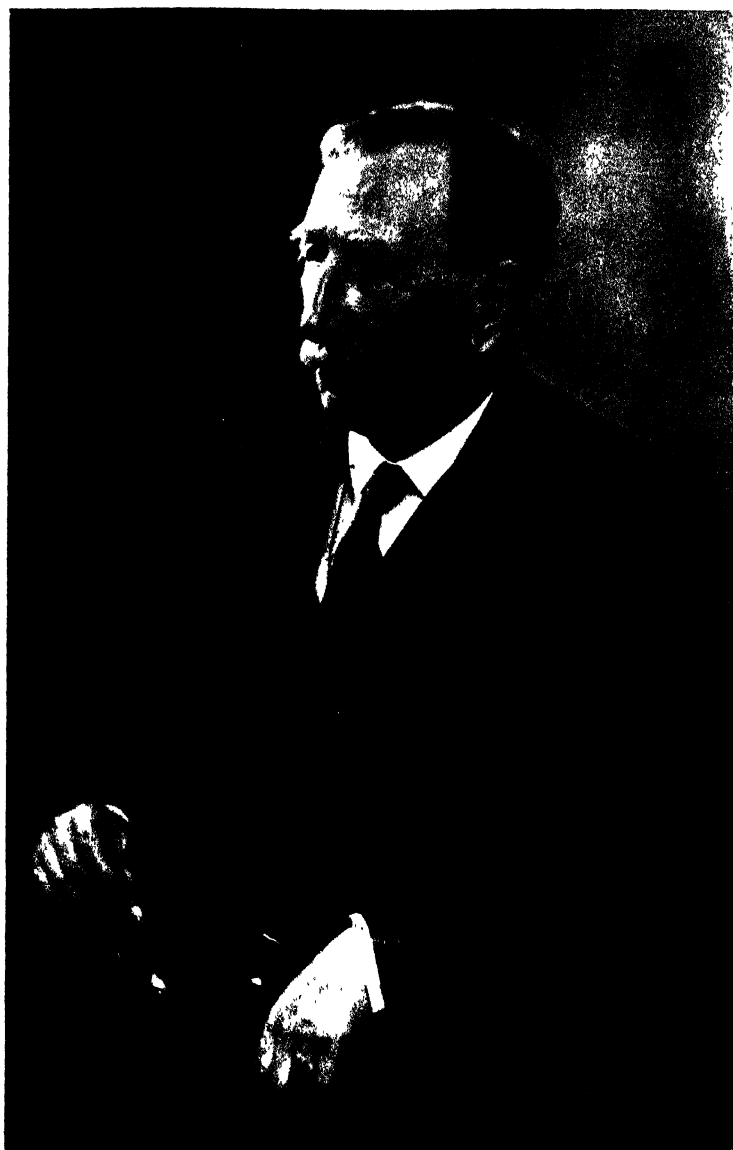
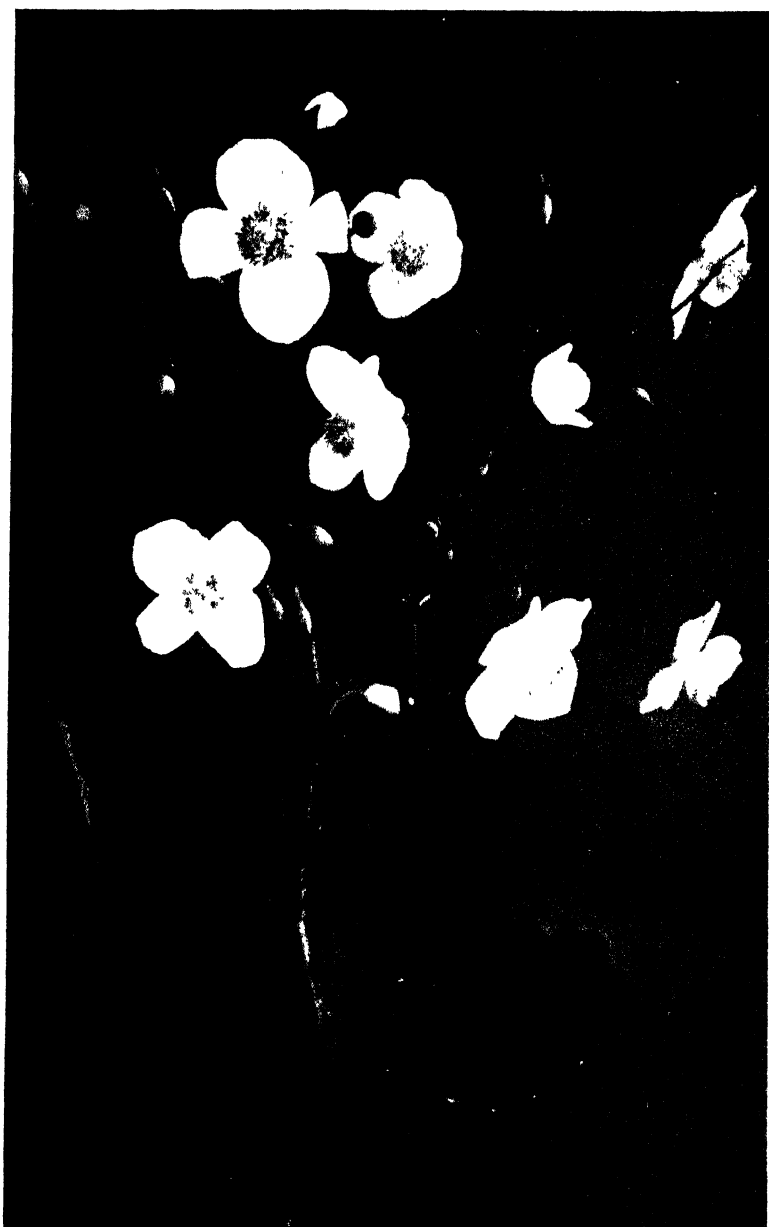


FIG. 104. SIR DANIEL HALL.
(See p. 319.)



Photo, N. K. Gould }

FIG. 105 EOMECON CHIONANTHA
(See p. 314)

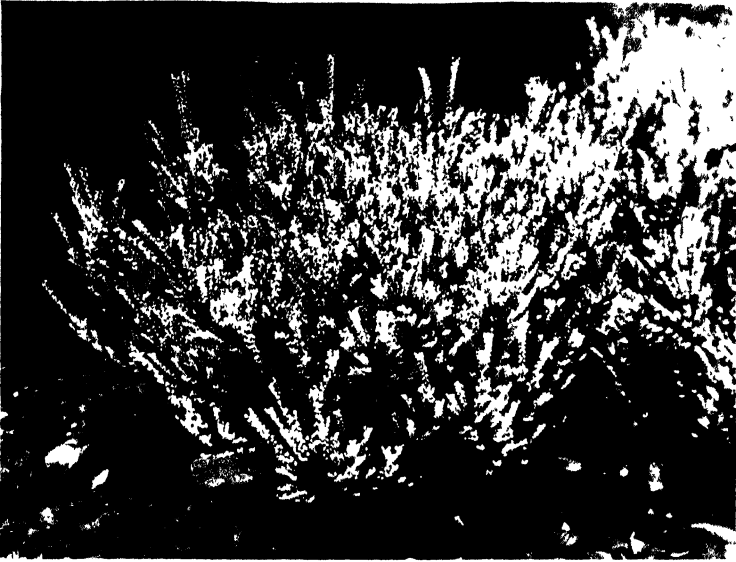


FIG. 106. *CALLUNA VULGARIS* VAR. *HIRIBICA*
(See p. 322.)

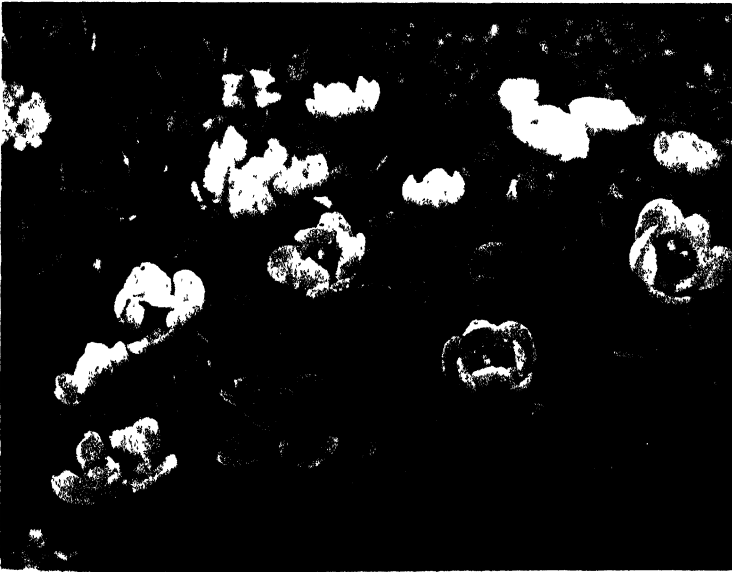


FIG. 107.---*PAEONIA* *MLOKOSIEWICZII*
(See p. 321.)



Bedrock surface, Nevada, U.S.A.

Fig. 108. A 12-year-old child of Anglo-Persian (H.F.)

Printed March 23, 1940

U.S. GEOLOGICAL SURVEY



By kind permission of the National Rose Society

FIG. 109 - *Tim Sawe*, B.D. JULY 3, 1940
The height of the man is 5 feet 9 inches
(See p. 339.)

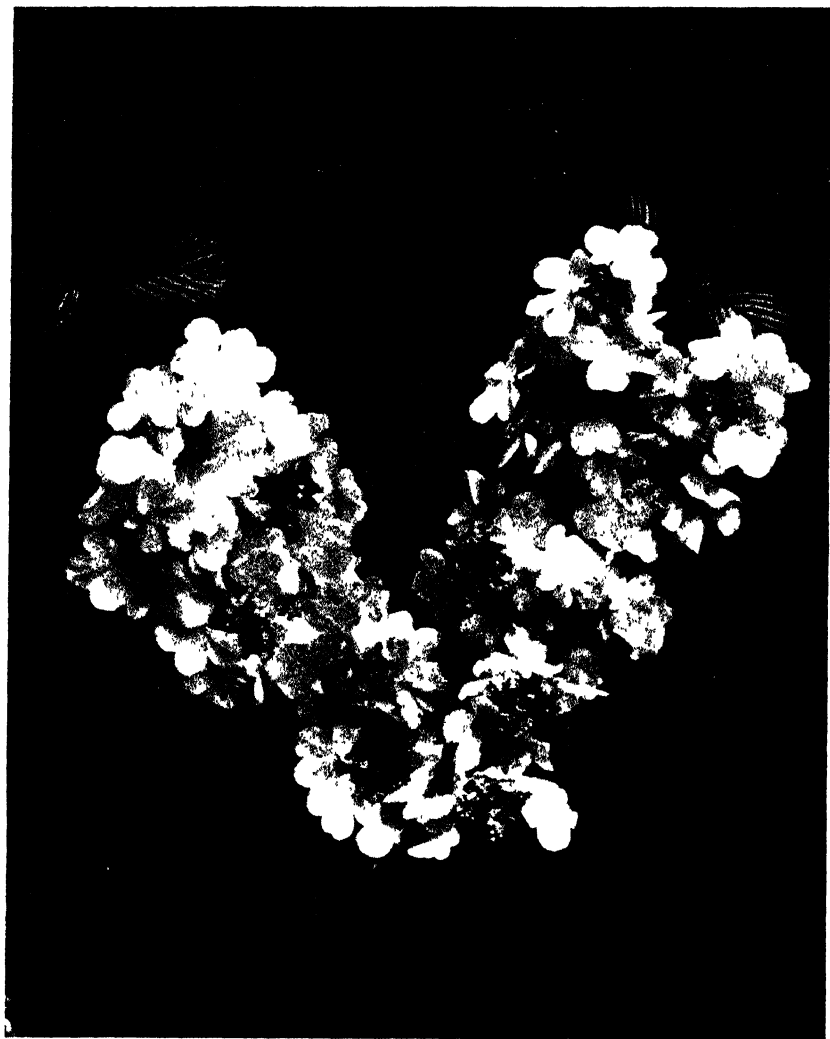
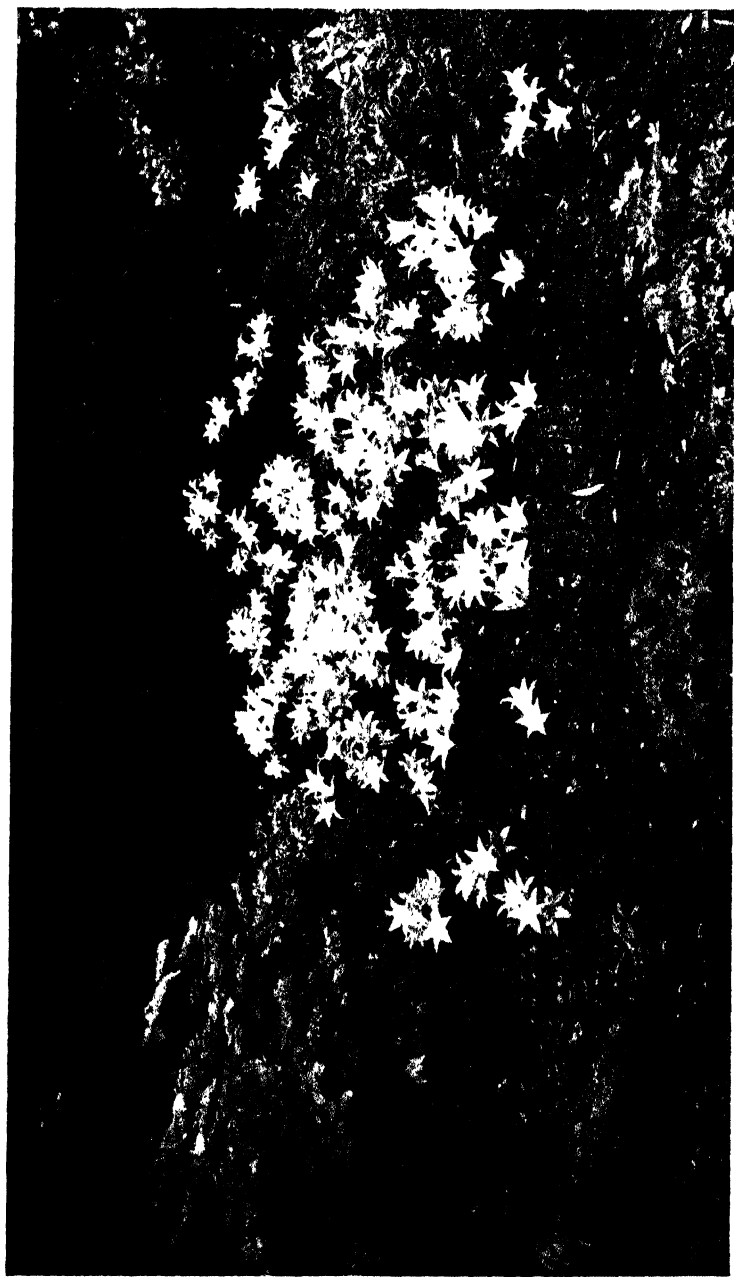


FIG. 110 —*VIBURNUM TOMENTOSUM* ROWAILANE VARIETY
(See p. 344.)



FIG. 111. *LILIUM MANGIESTII* DANESMERI VARIETY.
(See p. 343)



Photo, V. K. Gould.

FIG. 112. *AMARYLLIS BELLADONNA* AT WISLEY.
(See p. 314.)

or two only. So from a great many plants we obtain a few extra large blooms." That is utter nonsense. As a Rose grower of over fifty years' practical experience in leading English and Irish nurseries I must say I have found results just the opposite. My early years were spent with Messrs. Harkness of Bedale, and I well remember one late season this firm had not a rose bloom out on their maiden plants, but they cut from less than half an acre of old plants seventy-two distinct varieties which won the National Rose Society's Challenge Trophy at the Crystal Palace. This plot of Roses was planted seventeen years previously and had never given better bloom. The plants were cut to the ground each year. Mr. BRADFORD gives it as his opinion that drastic pruning is a shock to the plant. If that is the case why do we get strong plants the first year from a budded briar? The foster-mother is cut away close to the eye, and this insignificant little eye with nothing above it to draw up sap often produces plants 6 feet in height.

In the *Rose Annual*, 1936, Mr. HERBERT OPPENHEIMER, in his article on pruning of Roses the first year after planting, says: "short of cutting away the Rose bush altogether and leaving only the stock you cannot prune too hard." Mr. BRADFORD's advice on pruning newly planted Roses is too long to quote here, and it is neither clear nor convincing. Low pruning in my opinion helps to keep the plants young, and if a good big plant can be produced from one small eye when budded there is no apparent reason why the same should not occur when a plant is pruned low in later years. The late Sir E. J. HOLLAND, a prominent Rose exhibitor at the National Rose Society's shows, in his notes on Rose pruning, says: "it is necessary in the first place that reasons for pruning and the objects aimed at should be clearly understood. Shortly, they are, to ensure blooms of good quality, to preserve the plant in good health and vigour and to induce a more shapely plant." On pruning he says: "if the plant were allowed to grow unpruned, to run wild, the tendency would be for the production of numbers of small shoots at the top of the previous shoots. These would be developed early, almost certainly to be attacked by frost. The stems would become more or less bare, and the result would be a leggy plant, yielding a small and practically worthless bloom on short stalks with small foliage. Pruning therefore is a necessary operation. We often hear people say 'I want a lot of flowers; I do not grow for exhibition, so I do not prune very much.' That is a mistaken idea. Careful pruning is still required; it may not be so severe, but it must be skilfully done: a mere trimming up of the plant is not pruning."

When I left England in 1903 it was to take charge of the Roses at Messrs. Alex. Dicksons of Newtownards. At that time it was admitted that their collection was one of the most complete in the British Isles. In addition to the general stock they were raising about 1,800 new seedlings each year. The varied collection gave plenty of scope for all kinds of pruning, and there was the handling of these seedlings after their first year of growth. As is well known, plants grown from seed do not all flower the first year—indeed many of them took years of patient handling to induce them to bloom at all, so that all methods of pruning, and pegging down, had to be tried, and long pruning and no pruning at all amongst them. A field of these seedling Roses was not a sight to be envied, especially by the man who had them to handle, but here and there one came across a winner, and it had to pay for the

upkeep of those which eventually went to the fire. I was always glad to see the large bushes of 6-footers which made the patch look so ungainly go to the dump, and I do not want to see anything like them amongst my permanent plants.

I wonder how Mr. BRADFORD's article is going to appeal to those Rose enthusiasts who grow them in beds of 100 or 200 plants. If they adopt the system, what will they look like when they have reached the height admitted by Mr. BRADFORD to be 8 feet! A photograph of a Rose variety ('Portadown') pruned and unpruned appears in the pages of the JOURNAL, and a more weird specimen it would be difficult to imagine. Where are the new canes coming from the ground which Mr. BRADFORD mentions? Compare it with the photographs (Figs. 108 and 109) and see if you think it capable of producing anything like it. There is not a single tip on the plant of 'Portadown' that could carry erect medium-sized bloom. The sight of this plant alone should be sufficient to turn people against long pruning. The assertion that long-pruned Roses suffer less from frosts or cold winds can be left to the reader's own common sense. Have you ever bent down behind a wall or fence to escape strong wind? Well, a poor Rose bush cannot, and if it has blooms on at the time the result is disastrous.

In an admirable article on pruning Roses by Major G. F. MAPPIN in the *Rose Annual*, 1941, much on the same lines as those quoted above, he says: "Finally, to those who maintain that there is another school of thought which not only advocates long pruning, but boldly declares the orthodox method to be all wrong, the writer replies there is no such school of thought amongst Rose growers and exhibitors of approved authority. It is open, of course, to anyone to assert, but mere assertion unsubstantiated by any proof whatever in the way of ocular demonstration of results, if not to the public, then to a selected body of expert rosarians, can hardly be regarded as a serious contribution to the art of Rose cultivation."

I admit the failure of Rose trees nowadays is terrible, but the reason is not hard to find. Small Rose trees which were put on the fire twenty or thirty years ago are now sold in the stores or by cheap-jacks at 6d. or less per plant. These are often planted in borders near hedges, or among shrubs and herbaceous plants, and that is often the end of them. Had they been put into a bed by themselves, and cut hard back, the chances are many of them would have thrown strong growths from the base, but the majority never had any stamina and their chances were hopeless from the first.

Just one more point, and that is the advice given about budding Roses. Mr. BRADFORD advises not to remove the thin piece of wood behind the bud when inserting. That is quite correct, provided you have good big stocks with thick bark, but I would like to see Mr. BRADFORD budding some cutting briars which we have just finished this week: many of the briars were small and the bark like tissue-paper, and to make a good fit with well ripened buds meant the removal of the wood in most instances to achieve a good fit. Buds with the wood left in are perfectly stiff and will sit where they like and not just where the budder wants them, whereas when the wood is removed the bud is pliable and can be put into any position. The same applies to short jointed seedling briars: the bud without the wood will slip past the joint and bend to it, but not so the stiff bud with the wood left in.

THE TOMATO AS A NATIONAL FRUIT.

By ARTHUR HOARE,

Ministry of Agriculture and Fisheries.

A SEARCH of the horticultural literature published a century ago brings little reward in the shape of references to the Tomato as a cultivated crop for human consumption. There is not a single reference to the Tomato in the volume of the *Gardeners' Chronicle* for the year 1845 in the writer's possession, and none of the books of this period concerned with vegetable growing and fruit culture refers to the Tomato as a salad fruit. When mentioned at all it is in reference to its use as an ingredient in pickles, sauces and soups.

The tardy recognition in Britain of a fruit which was destined in the end to play such an important part in our national life is perhaps not difficult to understand. For the British public had received scant encouragement to take any interest in this plant from the New World, the Potato's fellow migrant, which JOHN GERARDE (1) had referred to in such scathing terms: ". . . the whole plant," wrote GERARDE in *The Herball or Generall Historie of Plantes* (1636 edition), "is of a rank and stinking savour." On the subject of its uses by what we must suppose GERARDE regarded as the less sophisticated of the human race he wrote: "In Spaine and those hot Regions they use to eate the Apples boiled with pepper, salt and oyle; but they yield very little nourishment to the body, and the same naught and corrupt.

"Likewise they eate the Apples with oyle, vinegre and pepper mixed together for sauce to their meat, even as we in these cold countries use mustard" (3).

Whether GERARDE's opinion of the Love Apple, as it was then generally called, definitely influenced public opinion in Britain it is difficult to say, but we do know that for the next two hundred years the possibilities of the Tomato as an edible fruit, and not just an ingredient of soups and pickles, received little attention.

The thirteenth edition of PHILLIP MILLER's *The Gardeners' Kalendar*, published in 1762, goes no further with the subject than the statement — "The Tomatos for soups and the capsicums for pickling which have been raised on hot beds should be transplanted to the places where they are designed to remain. . . . The Tomato should be near a wall, pale, hedge or espalier, to which the plants when grown must be fastened to support them" (3).

JOHN ROGERS in *The Vegetable Cultivator* (1843) remarks apropos of the "Love Apple": "There is but one variety (the old original red) worth cultivating; the yellow is not much noticed, and the Cherry and Pear-shaped, of French extraction, are of little worth" (2).

It seems clear from the available evidence that it was not until the nineteenth century was well advanced that the people of Britain, ever slow to accept new articles of food, began to take serious notice of the Tomato. And even then this tender annual plant, so unlike the general conception of a fruit tree or bush, was grown mostly in the open against a wall, a bank, or a fence and not under glass as is commonly the case to-day.

Gradually but steadily, however, the Tomato was moving upwards in popularity and, as is often the case, a fondness that developed slowly was destined to be more enduring. The commencement of the second

half of the nineteenth century found the Tomato taking its permanent place as a crop of the kitchen garden. It is true that the horticultural literature of the time reveals little enthusiasm for the fruit, and the day when it was to be referred to as "one of the most important vegetables grown" was still a long way off (5).

The eleventh edition of ELIZA ACTON'S *Modern Cookery*, published in 1851, contains five recipes for Tomata (*sic*) dishes, besides those for sauces and catsup. Under the heading of "*tomatas en salade*" the author remarks: "These are now served in England in the American fashion, merely sliced, and dressed like cucumbers, with salt, pepper, oil and vinegar."

It would appear, therefore, that the British people, ever unwilling to modify their gustatory inclinations through the persuasion of their continental neighbours, were ready to take a hint from their transatlantic kinsmen on the matter of the Tomato. The realization of the fact that this fruit had long been recognized in the United States as a necessary article of food, possessing refreshing and appetizing qualities, was no doubt largely responsible for the steadily increasing consumption witnessed towards the close of the nineteenth century. About this time the Tomato commenced its career as a popular fruit and from a select circle of discriminating epicures the consumption rapidly spread to the mass of the population.

In those days, too, varieties were both limited and specific. If we consult, for example, the well-known *vade mecum* of that famous generation of horticulturists, *Thompson's Gardeners' Assistant*, we find that Tomato varieties ran to about half a dozen sorts. In the red-fruited group there were a Large Red, a Small Red and an Early Red. There were a Large Yellow and a Small Yellow in the yellow-fruited group, and, to complete the list, there were horticultural curiosities like the Pear-shaped Tomato, the Cherry Tomato and the Red Currant Tomato, the last two, resembling in general appearance the Cherry and Red Currant, being more ornamental than useful (6).

It seems clear, then, that the horticulturists of the last century were confronted with several forms of the Tomato plant. The view is held by some authorities that these plants, differing so widely in the fruiting characters, belong to different species of *Lycopersicum*. In this connection it is interesting to note that the *Encyclopaedia Britannica* refers the common cultivated Tomato to *L. esculentum*, the Currant Tomato to *L. pimpinellifolium*, the Cherry Tomato to *L. cerasiforme*, and the Pear Tomato to *L. pyriforme*. It observes, however, that the last two are sometimes considered to be varieties only of *L. esculentum* (7).

By the time *The Dictionary of Gardening* was published the list of Tomato varieties had grown to a round dozen, and it is interesting to note that only the Large Red and Pear-shaped retain a place in the list, although the one yellow-fruited variety given, viz. 'Greengage,' was probably the renamed Small Yellow. But such names as 'Hathaway's Excelsior' and 'Dedham Favourite' indicate that the selectionist had been turning his attention to the Tomato, as to other vegetable crops, and that henceforward each year would bring its crop of new names. It is a point of interest at this time to note that the public had apparently decided in favour of red Tomatos (8).

No doubt much of the selectionists' attention was directed towards the eradication of the varieties bearing large, coarse and corrugated fruits, for fruits which were even in shape, whether fairly large or of medium size, and which were of a bright red or scarlet colour, met the

popular demand. The old varieties such as the Large Red and Large Yellow bore fruits which were very large, flattened and ribbed. How large Tomatos were in the last century may be gleaned from THOMPSON when, apropos of the Large Red, he states: "The fruits sometimes weigh as much as 12 ozs." Our imagination is tickled, too, when he goes on to say: "a single plant will produce from 20 to 40 lbs. of fruit," for even to-day such weights would be considered an achievement. Clearly in the Tomato *quantity* has given place to *quality*.

We may turn now to a consideration of the Tomato fruit itself and of the place it occupies to-day in the list of edible fruits. In botanical language the Tomato belongs to the group of fleshy or succulent fruits, and morphologically its structure is that of a true berry. The Tomato is, in fact, an excellent example of a berry. The fruit, formed by the simple fusion of two carpels, develops, as it ripens, a thick and juicy pericarp. This pericarp is composed of an inner thick mass of tissue of a pale red colour, while on the outside there is a thinner, tougher and deeper coloured layer of tissue, the skin. The ovary cavities are filled with a viscous fluid in which the seeds are embedded.

The true berries generally are an important source of much useful food material besides valuable vitamins, and the Tomato is no exception to this rule. Other examples of useful and valuable berries providing food for man are Black, White and Red Currants, Grapes, Bananas, Dates, Oranges, Lemons and Grapefruit. It may be remarked that berries share this pride of place with the drupes, which include the Plum, Peach and Cherry together with many of the so-called nuts such as the Coconut and Walnut. Thus the berries and drupes comprise our valuable fruits, and for two main reasons they play an important part in the economy of our daily dietary.

In the first place berries furnish food substances in the shape of protein, carbohydrates, fat and minerals. It is true that the amounts of these food substances are often small in relation to the total weight, so that berried fruits compare unfavourably in some respects with such commonly eaten foodstuff as cooked Potatos. Secondly—and this is important—the berries commonly supply a full range of vitamins, and so pass at once into the front rank of *protective* foods. That status is considerably enhanced by reason of the fact that the fruit is freely consumed in a raw condition, a point of importance in relation to vitamins A and C, which are apt to be lost in cooking. The Tomato contains four valuable vitamins, viz. A, B₁, B₂ and C, and it is calculated that 4 oz. of this food substance daily (24 hours) is sufficient to furnish the body's requirements of those important vitamins. Thus it seems that the Tomato's right to a place in human dietary is firmly established, and the great and thriving industry concerned with the cultivation of the Tomato crop for market has deservedly a place in our national economy apart from the widespread appreciation of the fruit on the part of the public. JOHN GERARDE was wrong!

Although the Tomato is an accommodating plant as regards soil conditions, its growth is entirely controlled by temperature. Like the Potato it is damaged by the slightest degree of frost, and active growth does not take place in a temperature below 60° F. It remains healthier in drier atmospheres where the air moves freely than under conditions of high humidity, where it is liable to attacks by Leaf Mould (*Cladosporium*), and Blight (*Phytophthora*). In the dry tropics Tomatos flourish and produce abundant crops in temperatures ranging up to 80° F. in the shade.

In Great Britain the cultivation of Tomatos is chiefly carried on under glass, although in the south of England outdoor crops are often quite successful. Glasshouse cultivation is, of course, an expensive method of production, involving amongst other things a consumption of fuel to provide artificial heat in the earlier months when night temperatures are low. Its advantages are an earlier, and a longer period of cropping coupled with heavier yields of fruit per acre of plants grown.

Under modern glasshouse conditions yields of from thirty to forty tons per acre are normally obtained (higher figures are obtainable), and picking may range from May to October with the one batch of plants. Under outdoor conditions, although yields up to twenty-five tons per acre are obtainable where conditions are favourable, the fruit seldom commences to ripen until mid-August, and, moreover, there is always a proportion of green immature fruits at the end of the season which will not ripen on the plant. It is clear, therefore, that under our conditions we must rely for the bulk of our supplies on glasshouse crops, although outdoor crops are a valuable source of supplementary supply.

An abundance of solar light with short nights, together with the appropriate degree of warmth, are important factors in Tomato growing under glass. Where artificial heat is available, Tomatos are usually planted out from February onwards, the plants being raised from seed sown from mid-December onwards. There is little to be gained from earlier planting. In unheated houses it is not safe to plant until mid-April or early May, according to the district. With the aid of artificial heat, therefore, a gain of time covering a period of about six weeks is possible, a point of considerable importance in our climate. Thus the Tomato appears to be one of the food crops which can be economically grown under glass during war time, and for which the consumption of fuel to provide artificial heat is substantially justifiable. In view of its all-round value and the reasonable price at which it is made available to the general public it certainly does not fall into the category of luxury crops.

Varieties.—The public taste to-day is definitely in favour of red Tomatos. Although yellow Tomatos are still grown to some small extent in private gardens, they are rarely seen in commercial establishments and are seldom offered for sale. The public favour, also, the medium-sized, smooth, evenly shaped fruits, running five or six to the pound. The large, uneven, and corrugated fruits are less favoured as salad fruit but are usually acceptable for kitchen purposes. The Cherry and Currant Tomatos are now rarely grown and then only as decorative plants. The Pear-shaped is also seldom seen.

Tomato varieties fall into two groups—those exclusively suitable for cultivation under glass and those suitable for outdoor cultivation. Many varieties in the latter group are, of course, quite suitable for glasshouse cultivation. During the present century much attention has been given to the development of improved varieties of the Tomato. Adopting both selective and plant-breeding methods, many of the leading firms of seedsmen and not a few private individuals took a hand in this task.

But the genetic background of the Tomato was unstable and in general the so-called new varieties, being no more than a selected form from an older type, were not "pure line" strains. Under cultivation such varieties tended to deteriorate, and the situation called for

further selecting work. The plant breeder has found that the results of breeding from genetically mixed parents usually fail to give permanent satisfaction. It is probable that some of the better known and established varieties which remained with us for a number of years were obtained by more careful methods, for, although some variation may have occurred, these varieties continue to exhibit the more or less permanent characteristics by which they became generally known. We can call to mind such type varieties as 'Kondine Red,' 'Sunrise,' 'Comet,' 'Ailsa Craig,' 'Potentate,' 'Stonor's M.P.,' 'Blaby,' 'Best of All' and 'Market King.' 'Comet' has now gone out of cultivation, and 'Sunrise' is not very popular. Mr. STONOR has followed up the success of 'M.P.' with his 'Exhibition,' 'Prolific' and 'Money-maker,' a good family of useful varieties. 'Kondine Red,' 'Ailsa Craig,' 'Potentate' and 'Market King' have maintained their place as commercial varieties, although 'Kondine Red' and 'Potentate' are regarded as on the coarse side.

That careful breeding methods can confer permanent improvement on a Tomato variety is evident from the success which has attended the variety launched by the Cheshunt Experimental Station some twelve years ago and known as 'E.S. 1.' This variety was the result of a cross between 'Ailsa Craig' and 'Blaby'; it is still going strong and shows little sign of deterioration when grown from seed saved from healthy plants. 'E.S. 1' was probably the first variety of Tomato of which it could be said that it bred true. It was in fact a great step forward in this particular field of investigation (9).

An interesting fact relating to the genetical behaviour of the Tomato emerged during the plant-breeding work carried out at Cheshunt. It was discovered that segregation occurs within the plant itself, so that it does not follow that the progeny of one fruit on a given plant would resemble that from another. The variety 'E.S. 1' was in fact obtained from two fruits on a plant, the remaining fruits of which gave rise to impure mixtures. It is extremely unlikely that this fact was known to those who had earlier tried their hand at evolving new Tomato varieties!

But the stability and undoubted genetical purity of 'E.S. 1' provided sound material for future breeding. It was a high-class Tomato with the one small fault that under some conditions the fruits were on the small side. Later, both its value as a parent and the fact that size of fruit was a recessive character were demonstrated when the Station produced 'E.S. 3' by crossing 'E.S. 1' with 'Comet.' This variety has, however, since been discarded for other reasons.

An important factor in crop production is the behaviour of the crop plant in relation to disease conditions. The Tomato is no exception to the common fate shared by all plants exploited for man's benefit. Under glass it is assailed by numerous insect pests such as Wireworm, White Fly, and Red-Spider Mite; by formidable fungus diseases such as those which cause a wilting followed by death of the plants, and Leaf Mould or Mildew which destroy foliage. Lastly those complex plant viruses which produce disabling conditions amongst so many valuable crop plants are represented by the now familiar Mosaic disease. Under outdoor conditions the plants are subject to fierce attacks by the Potato Blight fungus, *Phytophthora infestans*, which, as the 1941 season showed, can rapidly bring about the death of the plant unless it is sprayed regularly with a suitable fungicide. A Tomato variety, then, has to stand up not only to these

conditions, but in so far as glasshouse crops are concerned, to the evils attendant on the intensive system of cultivation, which are undoubtedly aggravated by a system of husbandry often involving the use of the same structures and the same soil year after year without change of crop.

In the circumstances, therefore, it was to be expected that scientific plant breeders would sooner or later concentrate their attention on the search for varieties resistant to disease. As Leaf Mould has always been the bane of the grower under glass, the breeding of good types resistant to this disease became a matter of primary importance.

At the Cheshunt Research Station the use of breeding parents of types revealing some measure of resistance to the Leaf Mould fungus led to the introduction in 1936 of 'Leaf Mould Resister No. 1.' But although it proved highly resistant to Leaf Mould its cropping powers were, on the whole, lower than the standard commercial varieties. Growers preferred to take the risk with high cropping varieties.

Elsewhere (in Denmark, Canada and the U.S.A.) experimental work had been undertaken with the 'Red Currant Tomato' (*L. pimpinellifolium*) as one of the parents. This species possesses a marked degree of resistance to Leaf Mould. In Denmark the results of this breeding work gave rise to two varieties called 'Virum A' and 'Virum B,' but although tests at Cheshunt in 1938 revealed that the former was superior in cropping powers to the latter, both, unfortunately, were attacked by Leaf Mould disease.

The most encouraging results were obtained in Canada, where Dr. A. N. LANGFORD, working at the Vineland Horticultural Experimental Station, Ontario, bred the new variety called 'Vetomold.' It is a cross between the 'Red Currant Tomato' and 'Potentate.' This variety arrived in this country in 1939 and was distributed for trial to leading growers by the Cheshunt Station. 'Vetomold' has emerged from the exacting tests to which it was submitted up and down the country with conspicuous success, possessing not only high qualities as to growth and cropping powers but that much-desired quality—resistance to Leaf Mould. As Dr. BEWLEY has stated, 'Vetomold' represents "a triumph of plant breeding" (10).

Thus it is clear that, despite our tardy recognition of the value of the Tomato in our national life, we have made considerable progress with its development since the beginning of the present century. It is a good sign that there is now a widespread appreciation of the fruit's qualities on the part of the general public. It is of special interest to reflect that as a result of our great expansion in commercial glasshouses the Tomato is the only fruit of which we can be *reasonably certain* of producing a crop every season, irrespective of weather conditions, and at a price which places this healthful fruit within the reach of all.

As was remarked earlier in this article, the Tomato is an accommodating plant in some respects, and after a score of years' close acquaintance with the plant's behaviour under conditions in Great Britain the writer has little doubt that, given healthy material for planting, it is the physical factors associated with the plant's environment, *i.e.* light, temperature, soil conditions and water supply, which are of primary importance in raising crops of this useful fruit in Great Britain.

Lastly it is worth noting that the Tomato is one of the crops which can be successfully grown in the absence of soil. Experimental work—

with soilless culture at the Reading University Horticultural Station is at present in progress with this crop as one of the subjects of investigation. This soilless culture, which should not be confused with the system which has been labelled "hydroponics," offers distinct possibilities for the future (II).

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THE CONTROL OF RHODODENDRON BUG WITH AN ATOMIZED PYRETHRUM EXTRACT.

By AIR VICE-MARSHAL A. E. BORTON, C.B., C.M.G., D.S.O., D.L.

IN April of this year a Fellow of the Society, Mrs. L. BORTON, asked the assistance of the Wisley Laboratory in dealing with an infestation of Rhododendron bug, *Stephanitis rhododendri*, in a plantation where hand spraying would be impracticable, and was recommended to try the effect of an atomized Pyrethrum extract. This treatment appeared to give satisfactory results, and the following account of the application may be recorded for the benefit of others interested in the control of the bug in large areas of Rhododendrons.

During the first week in June the activity of the Rhododendron bug became evident. Arrangements were made one evening, when the wind was light and in the right direction, for the tractor employed in fruit spraying the orchard bounding the Rhododendrons to give an experimental run up and down the garden boundary. The results were very promising, both as regards the Rhododendrons and caterpillar in the young Oaks which shade the Rhododendrons. The width of the garden, however, and the presence of a well-grown Beech hedge between garden and orchard prevented satisfactory penetration to all the plants. The effect was sufficient to check the development of the bug in its early stages for a considerable time.

It is of interest to note that the tractor was brought into one point of the garden which it could reach and was kept at that point unduly long. The nearby bushes became saturated with the oil used in the mixture with no ill effects and no signs of subsequent scorching of the leaves.

Enquiries were then made as to whether something more convenient than the tractor could not be employed. The firm which supplies the Pyrethrum extract for our fruit washing was consulted, and they very kindly loaned a handy portable small engine-driven

atomizing plant and knapsack spray. With this apparatus the whole of the *Rhododendron* garden was thoroughly sprayed on June 16 and 17.

The results were most satisfactory. An inspection next day showed that quantities of bugs were dead on the underside of the leaf, though many had of course dropped off. No live bugs were seen.

A periodic watch—not very thorough—was kept for renewed activity. Towards the end of June this became noticeable in scattered places but not in such quantity as to warrant general treatment. By July 3 there was a definite increase and all affected plants were sprayed. There was, if anything, too strong a wind, but much evidence was seen of immediate effect.

A wasps' nest was also experimented on, with temporarily good effect.

On July 5, we estimated that 80 per cent. of the bugs had been killed—scattered colonies were observed which had either been missed owing to the wind or had since hatched out. These were dealt with by occasional local treatment with a hand spray.

Towards the latter part of the month fresh activity was observed and winged females were in evidence, but still on the under sides of the lower leaves. A further treatment was evidently necessary, and on July 13 the whole of that part of the garden was thoroughly sprayed. A comparatively still evening was chosen and the vapour drifted well through the bushes. An examination next day showed good results.

A periodic, and admittedly not very thorough, inspection subsequently did not bring to light any further activity by the end of the first week in August.

The shrubs are now looking more healthy than they have in the past two years. The rusty appearance of leaves affected in previous years is noticeable and gives an indication of which plants must again be watched. But, except in one badly affected case which will probably not recover, they are making strong fresh growth.

The general conclusions reached after one season are that the bug can be definitely kept in check by atomising or spraying with a *Pyrethrum* mixture. Whether it will be possible in a second or third year to eradicate it remains to be seen.

The *Rhododendron* garden covers an area of approximately $\frac{3}{4}$ acre. It was found that it could be thoroughly treated in about one hour, preferably by two people, one carrying the knapsack spray, the other to move the engine and watch the pressure pipe to the knapsack.

FOOD FROM THE SMALL GREENHOUSE.

By J. WILSON.

MANY Fellows possess at least one small heated glasshouse and, if sufficient artificial heat is available during the winter and early spring, a number of early vegetables can be grown which will provide a welcome change of diet, and, in addition, be useful in filling the gap in the vegetable supply which usually occurs during April and May. Moreover, the soil and conditions in many gardens are unsuitable for the early sowing of vegetables in the open, and in those instances where facilities exist it is an advantage to raise plants under glass for planting in the open garden when soil conditions improve. It is with this object

in view that these notes are written, with suggestions of how the best use can be made of such houses the whole year round.

As glasshouses vary considerably it will only be possible to give a few general hints on the best way to adapt them for this purpose. Few existing houses are ideal for the growing of vegetables, nevertheless with a little improvising these can be adapted suitably. A most useful type of house is a span-roofed glasshouse of about eight feet wide, which allows for a central pathway and stages on each side, the stages being about three feet wide. In this instance crops can be grown either in a bed of soil or in boxes placed on the stages. On the other hand, some glasshouses are without stages, and if they are light and not too lofty crops can be grown at ground level in well-prepared soil. Lofty houses of the conservatory type are not suitable for the raising of vegetable seedlings but they might be useful to grow a crop of Tomatos during the summer and autumn. If shelves already exist they will be invaluable for the raising of seedlings during the spring, and it is an advantage if the shelves can be removed for the summer so that they do not interfere with the Tomatos.

The heating system should be such that a night temperature of about 40° to 45° F. and a day temperature of about 45° to 50° F. can be maintained during the winter. During the spring a higher temperature will naturally be maintained until artificial heat can be dispensed with during the summer and autumn. In order that there should be no loss of heat, houses should be as airtight as possible and ventilators in good working order.

Whatever type of house is used it is advisable to have, in conjunction with it, a cold frame for hardening off seedlings raised in the early spring, ready for planting out in the open garden.

Cleanliness is of the utmost importance and a word of warning is necessary against the practice of retaining a miscellaneous collection of odd plants which might prove to be carriers of pests and diseases.

Much will depend upon the care and attention which is given to watering and ventilation. This can only be learned by experience and will depend upon the prevailing weather conditions. During the coldest part of the year take advantage of bright periods in which to water the plants and damp down the house, always aiming at moderately dry conditions towards evening. As the sun increases in power the plants will require more water and the damping down to be more frequent. When watering a box or pot make certain that the water penetrates the full depth of the soil. At no time should the plants suffer from lack of water and dry patches should not exist under the stages or behind the hot-water pipes. Endeavour to ventilate the house as early as outside conditions permit, admitting a little air to begin with, and gradually increase as the outside temperature rises until the maximum ventilation is reached. During the early part of the year trap as much sun heat as possible by closing the house in the afternoon as early as is compatible with outside conditions.

Although not absolutely necessary, a supply of loam or top spit is desirable; failing this use good garden soil, provided it is known to be in "good heart," and for preference taken from a part of the garden in which vegetables have not been grown recently. Obtain a supply of powdered chalk, superphosphate, wood ashes and hop manure; a little sand and granulated peat are valuable assets. Boxes or the material to make them might be difficult to obtain in these times, but old bulb, kipper and sugar boxes, with a little alteration, might be

pressed into service or, if suitable rough timber is available, boxes can be made to fit the staging, which, of course, will be an advantage as every inch of space can then be used.

Whatever soil is used should be kept under cover so that it will be in fit condition at the time when it is required to fill the various boxes ; placed direct on the stages or into roughly constructed troughs, the latter are often used for the growing of Tomatos. It is an advantage to have the compost mixed before it is required. Naturally for vegetables the compost should consist mainly of loam or good garden soil, with the addition of a little hop manure if necessary, and the quantity of granulated peat and sand (if any) will depend upon the texture of the soil. To every bushel of soil should be added $\frac{3}{4}$ oz. of the powdered chalk and $1\frac{1}{2}$ oz. of superphosphate. For the majority of vegetables the compost should be thoroughly mixed and then passed through a half-inch sieve. Compost required for Tomato and Cucumber beds should be left quite coarse.

In order to crop a house to its fullest capacity it is recommended that the cropping be as follows :—

- (a) Early vegetables which mature entirely under glass.
- (b) Raising vegetable seedlings which, when well established, are transferred to a cold frame and later to the vegetable garden.
- (c) Tomatos, which will occupy the entire house during summer and autumn after the crops in (a) and (b) groups are cleared.
- (d) Crops to blanch or force after the Tomatos are cleared.

In Group (a) are Carrots, Lettuces, Salad Onions, Radishes, Mustard and Cress and Dwarf French Beans.

During early January make a sowing of Carrots of the Shorthorn type either in deep boxes or in a bed, followed by a further sowing during early February. Sow seeds thinly and do not thin the seedlings more than one inch apart. 'Amsterdam Forcing' is an admirable variety for this purpose.

Make a small sowing of Lettuce seeds in a box about the middle of October, followed by two other sowings during December and January respectively. As soon as the seedlings can be handled transfer them to their permanent places either in boxes or beds, planting the seedlings five to eight inches apart in each direction according to variety. When transplanting be careful not to bury the seedlings too deeply but rather err on the side of high planting. For earliest supplies 'Cheshunt Early Giant' is recommended, followed by 'Green Frame' and 'Gotte à forcer.' Unless conditions are favourable and every attention can be given to cultural requirements it is unwise to attempt the cultivation of Lettuces under these conditions.

Early in January make a sowing in a box or bed of Onions for pulling green. White Onions are to be preferred ; the variety 'White Lisbon' is good for this purpose, but seeds might be difficult to obtain. Failing this variety one of the Rocca or Trebons type is recommended. For succession make a similar sowing early in February.

Periodical sowings of Radishes can be made from January to March, being careful to sow thinly and to limit the sowings to small quantities at one time.

Although Mustard and Cress is usually produced all the year round it is difficult to grow in a low temperature and prefers one about 55° to 60° F. Many novices fail completely with this crop as it is very subject to damping off. Sow Cress four days earlier than the Mustard

which is intended to accompany it. Prepare the box by carefully sifting the soil through a quarter-inch sieve, using maiden loam if possible, and lightly press down the surface soil with a piece of board. To make certain that no soil adheres to the seed leaves lay a piece of muslin or clean coarse sacking over the surface of the soil, afterwards thoroughly soaking both covering and soil *before* sowing the seeds. Sow the seeds on the surface of the soil or covering but *do not* cover them with soil. Cover the box with a sheet of brown paper until the seeds are germinated and the seedlings about half an inch high. Replace the brown paper with a sheet of newspaper for a day or two, and gradually accustom the seedlings to the light, when the paper can eventually be discarded. If a suitable temperature can be provided successional sowings should be made.

Do not attempt to sow seeds of Dwarf French Beans until early March, when it is possible to maintain a fairly high temperature. Place four or five seeds in an eight-inch pot or make a sowing in a box. Keep the plants clean by frequent syringing and make a successional sowing three weeks later. 'Masterpiece' and 'The Prince' are good varieties for this purpose.

Among the crops referred to under (b) for raising under glass and ultimately planting in the open are Peas and Broad Beans, Lettuces, Cabbages and Cauliflowers, Onions, Celery and Celeriac, Tomatos, Marrows and Ridge Cucumbers and Sweet Corn.

Sow in boxes towards the end of January or early February seeds of Peas and Broad Beans, and as soon as the seedlings are well established transfer them to a cold frame prior to being planted out in the vegetable garden towards the end of March. 'Kelvedon Wonder' and 'Superb' are suitable Peas, and 'Early Longpod' and 'Green Leviathan' good Broad Beans for the purpose.

Sow a pinch of Lettuce seeds in February of the varieties 'May Queen' or 'Trocadero,' and when large enough transfer the seedlings into boxes, placing them about one and a half inches apart in each direction. When well established move to a cold frame for planting in the open garden in early April.

Make a small sowing of early maturing varieties of Cabbages and Cauliflowers in February and treat as recommended for Lettuces. Cauliflower 'First Crop' or 'Forerunner' and Cabbage 'Velocity' or 'Primo' are recommended for this purpose.

During early February sow thinly in a prepared compost in boxes any of the well-known good-keeping varieties of Onions. Towards the end of March when the seedlings are well established remove them to a cold frame with the object of transplanting them to a well prepared bed in the open garden about the middle of April.

For main crop supplies of Celery and Celeriac sow about the middle of March, and when the seedlings are large enough prick out, either into boxes or a cold frame, for transplanting into their permanent positions during early June.

For outdoor crops of Tomatos sow in April such varieties as 'Stonor's M.P.', 'Market King,' or 'Harbinger.' When large enough transfer the seedlings into four-inch pots, and when the plants are well established harden off and place in a cold frame about the middle of May, and ultimately into their permanent positions during the first week of June.

Both Marrows and Ridge Cucumbers can be sown in small pots about mid-April with the object of transferring well-established plants

to the open ground during the first week in June. Any well-known variety of the bush or trailing Marrow, and Cucumber 'Perfection Ridge' and 'Long Ridge' are recommended.

When it is desired to grow Sweet Corn, and in order to provide a longer growing season, the plants are better for being raised under glass. Sow about mid-April in small pots, and when thoroughly established harden off in a cold frame, planting out in a sunny position in the garden towards the end of May.

When conditions in the garden are unfavourable for early sowing, seedlings of Brussels Sprouts, Leeks, Dwarf and Runner Beans may be raised under glass for planting out when large enough after the seedlings have been well hardened. Sow the two first-named kinds in early March and the latter two about the middle of April.

Where a quantity of cloches are available the sowing and planting dates of Lettuces, Cabbages, Cauliflowers, Dwarf Beans and Runner Beans can be pushed forward a little.

Turning to Group (c), it is recommended that the house be given over to the growing of Tomatos during the summer and autumn, but these need not be planted in their permanent positions until early May, thereby allowing the space to be used for growing other crops in the interval. In order to accomplish this Tomato seeds should not be sown until late February, when a temperature of about 55° to 60° F. can be maintained. When large enough prick out the seedlings into small pots and later transfer to those of five inch diameter. When well established plant out into the prepared bed.

As Cucumbers have no high food value a lot of space under glass should not be devoted to them in war-time. On the other hand, in those parts of the country where Ridge Cucumbers cannot be relied upon in the open a few plants of this type might well be grown in a Tomato house. Sow Cucumber seeds in small pots towards the end of March, and when the plants are well established plant direct into a prepared bed of light compost.

Group (d).—After the Tomato crop is cleared in the late autumn the house can be used for the blanching of Endive and the forcing of Chicory, Seakale and Rhubarb. Successional batches of Endive for blanching can be introduced during the winter months and likewise a succession of Chicory and Seakale roots can be forced under the stages or in any receptacle where the crowns can be kept moist and dark. In the same way, towards Christmas, a few roots of Rhubarb can be forced for providing an early crop.

For an early supply of Mint place a few roots in a box in autumn and introduce into warmth early in January. Parsley sown during August in a box in the open can be placed in a glasshouse during early winter for providing a supply of leaves during those times when outside conditions do not permit gathering. A few roots of Chives growing in a pot or box give a welcome supply of young leaves if placed in warmth early in the year. During January or February a few seeds of Chervil sown in a box add to the variety of plants which can be produced out of season in a glasshouse of this description.

As experienced cultivators will realise there are other vegetables which can be grown with success under glass during the early part of the year, but it has been thought best to draw attention to those possessing a high food value.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1942.

Border Carnation 'Cameo.' A.M. July 20, 1942. A hardy border variety, with stout, stiff stems. Flowers $2\frac{1}{2}$ inches diameter, of good shape, full centred, white ground, pencilled towards margins with a tone of Pansy Violet (between H.C.C. 033/2 and 033/3), margins of petals almost entire. Calyx strong. Raised and shown by R. Thain, Esq., Thatch Lossum, Shalford, nr. Guildford. See p. xlviii.

Border Carnation 'Farmer Butler.' A.M. July 14, 1942. A hardy yellow ground fancy variety, with a strong stiff stem. Flowers $2\frac{1}{2}$ inches diameter, of good shape and form, Barium Yellow ground (H.C.C. 503/2) heavily flaked with Orient Red (H.C.C. 819/1). Calyx strong. Raised and shown by R. Thain, Esq., Thatch Lossum, Shalford, nr. Guildford. See p. xlvii.

Border Carnation 'Hilda Moody.' F.C.C. July 7, 1942, as an exhibition variety. A border variety. Described R.H.S. JOURNAL, 65, p. 304. (A.M. 1940.) See p. xlv.

Border Carnation 'Leslie Rennison.' A.M. July 7, 1942, as an exhibition variety. A hardy border variety, with stiff, stout flower stems. Flowers $3\frac{1}{4}$ inches diameter, full centred; petals broad, of thick texture, a tone of Magenta Rose (H.C.C. 627/1 to 627/2); calyx strong. Shown by R. Thain, Esq., Guildford. See p. xlv.

Border Carnation 'Limpsfield White.' F.C.C. July 7, 1942, as an exhibition variety. Described R.H.S. JOURNAL, 63, p. 445. (A.M. 1938.) See p. xlv.

Border Carnation 'Patrick.' A.M. July 14, 1942. A hardy Picotee variety, with a stiff stem. Flowers $2\frac{1}{4}$ inches diameter, open centre, creamy-white ground, very narrowly edged Beetroot Purple (H.C.C. 830/3). Calyx strong. Shown by W. G. Ferris, Esq., Woodhurst, East Horsley. See p. xlvii.

Border Carnation 'Sister Teresa.' A.M. July 7, 1942, as an exhibition variety. A hardy variety of vigorous growth, with strong and stiff flower stems. Flowers $3\frac{1}{4}$ inches diameter, centre full; petals broad, of thick texture, a tone of Chrysanthemum Crimson (H.C.C. 824/1) on outer petals, shading to Cardinal Red (H.C.C. 822/2) on inner; calyx strong. Shown by R. Thain, Esq., Shalford, Guildford. See p. xlv.

Delphinium 'Audrey Mott.' A.M. July 6, 1942, as an exhibition variety. Flower spikes strong, $3\frac{1}{2}$ feet long, somewhat tapering, with evenly spaced semi-double flowers $2\frac{1}{2}$ inches diameter; outer petals Butterfly Blue (H.C.C. 645/1), inner petals Rose Purple (H.C.C. 533); eye white. Raised and shown by F. A. Bishop, Esq., The Glade, Clewer Green, Windsor. See p. xlv.

Delphinium 'George Bishop.' A.M. July 6, 1942, as an exhibition variety. Flower spikes strong, $3\frac{1}{2}$ feet long, tapering, evenly spaced semi-double flowers, 3 to $3\frac{1}{2}$ inches diameter, outer petals Cobalt Blue (H.C.C. 44/3), inner Amethyst Violet (H.C.C. 35/3); eye dark brown; side spikes few, strong. Raised and shown by F. A. Bishop, Esq., The Glade, Clewer Green, Windsor. See p. xlv.

Lilium Manglesii Danesmere Variety. A.M. July 14, 1942. This hybrid Lily is stated to have been raised from *L. croceum* \times *L. tigrinum*. The influence of the first-named parent is indicated by the whorled arrangement of the lower flowers. From *L. tigrinum* the hybrid has inherited colour and size of flower and a tendency to the production of stem-bulbils. Raised and exhibited by J. E. H. Stooke, Esq., Danesmere, Hereford. See p. xlvii and Fig. 111.

Scirpus Tabernaemontani albescons. A.M. July 14, 1942. A hardy aquatic plant closely related to the common Bullrush, forming bold clumps of leafless, quill-like stems 3 to 4 feet high, variegated with longitudinal white and green stripes. Exhibited by Mr. Amos Perry, Enfield. See p. xlvii.

Viburnum tomentosum Rowallane Variety. A.M. July 14, 1942. A very fine, late-flowering variety of *V. tomentosum*, forming a bush of neat habit and less vigorous than the well-known variety *Mariesii* or the Lanarth variety. The small, creamy, fertile flowers form a peduncled cyme about 3 inches across, around the margin of which are arranged 8 or 10 snow-white sterile flowers, each $1\frac{1}{2}$ to 2 inches in diameter with 4 large, rounded segments and a fifth which is very much smaller. The leaves are ovate, 2 to $2\frac{1}{2}$ inches long, conspicuously veined. Exhibited by Collingwood Ingram, Esq., Benenden, Kent. See p. xlvii and Fig. 110.

Vuykstekeara × ‘Cuesta.’ A.M. July 14, 1942. This is a showy hybrid, and on the present occasion bore a spike of four flowers, the sepals and petals purplish-crimson, the expansive labellum whitish with rose spotting and a large crimson area at the base. The result of crossing *Vuykstekeara* ‘Cambria’ with *Odontoglossum* ‘Purple Queen.’ Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath. See p. xlvii.

BOOK REVIEWS.

“Fruit.” By André L. Simon. 8vo. 126 pp. (The Wine and Food Society, London, 1942.) 7s. 6d.

This is the fifth section of *A Concise Encyclopædia of Gastronomy*, edited by M. André Simon (the fourth section, Cereals, still awaits publication); as in the companion volume on vegetables, an alphabetical list is given of the many fruits, usual and unusual, that can be used as food. For the adventurous there are delightful sounding names—‘Pulassan,’ ‘Molle de Beber,’ ‘Conquito’—but one would probably not meet these outside their native homes. The more familiar fruits are more fully dealt with, often with the addition of recipes, but many of these will offer the reader only the pleasures of anticipation, for their ingredients are not readily attainable in war-time. If the book is rather tantalising in these days of meagre fare, its usefulness will not deteriorate and it certainly provides a very complete guide to the edible fruits.

“A Revision of Melanconis, Pseudovalsa, Prosthecium and Titania.” By Lewis E. Wehmeyer. 161 pp. Illustrated. (University of Michigan Press; in England, Humphrey Milford, Oxford University Press, 1942.) 14s.

This book forms Volume XIV of the Scientific Series issued by the University of Michigan; it is a revision of the genera of fungi given in the title, whose chief hosts are catkin-bearing trees. Eleven plates give structural details of various species in each genus.

“The Cultivation of Medicinal Plants.” Bulletin No. 121, Ministry of Agriculture and Fisheries. 8vo. 27 pp. (H.M. Stationery Office, 1942.) 6d.

In an earlier Bulletin (No. 76) the subject of Herbs was dealt with, and some of the material there used has been incorporated in this new publication, which is, however, much wider in scope. Many of the drugs used in this country have previously been imported from abroad, some of necessity, as the plants cannot be grown in England, and some because to collect wild plants in their native country is cheaper than to grow them here. Now that many sources of supply are cut off it will be necessary to encourage the cultivation of such medicinal plants as can profitably be grown here. Each plant is dealt with separately, the part used to provide the drug mentioned and the type of land and method of cultivation given, as well as any special points and precautions. Anyone who is proposing to devote a few acres to the cultivation of these plants should consult this very helpful pamphlet.

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Part II

November 1942

THE SECRETARY'S PAGE.

Subscriptions.—Fellows and Associates are reminded that anyone elected to the Society and paying his first subscription between now and the close of the year, will enjoy the privileges of Fellowship for the remainder of 1942 and will not be required to pay a further subscription until January 1, 1944.

Shows.—The Council regret to inform the Fellows that, owing to the restriction in the transport of plants, which comes into force on November 1, it will not be possible to hold the Show on November 3 and 4 as planned.

A Calendar of Meetings for 1943 has been arranged. On February 16 there will be the Annual General Meeting at 3 o'clock in the New Hall Lecture Room, when the President will give his address and distribute the awards. There will then follow a series of meetings, on April 13, May 18, June 15, a Fruit and Vegetable Show on July 13, an ordinary meeting on September 21 and another Fruit and Vegetable Show on October 5.

At the meetings, commencing with April 13, the Standing Committees will meet for adjudication on plants submitted to them. Fellows are invited to bring with them fruits, vegetables, flowers or plants, especially those of interest and of recent introduction. Full particulars as to the times when plants are to be brought and handed to the Committees will be published from time to time in the JOURNAL.

The Journal.—The monthly meetings as given in the Calendar above necessarily restrict the opportunities of showing new and rare plants by the Fellows. It would be a pity if no records were kept of the behaviour of the newer plants resulting from recent plant collecting expeditions, or from hybridization, which may flower between the dates on which meetings are held. Fellows, both amateur and trade, are, therefore, invited to send notes and photographs for insertion in the JOURNAL.

Demonstrations at Wisley.—On November 4 and 5, from 2 to 4 P.M., there will be a demonstration of the Planting of Fruit Trees and Roses in the Fruit Garden at Wisley. On December 2 and 3, from

11 A.M. to 1 P.M., there will be a demonstration in the Fruit Garden on the Pruning of Fruit Trees.

How to get to Wisley.—The London Passenger Transport Board has supplied the following information in regard to rail and 'bus services to Wisley, taking the place of the Green Line 'bus services which were withdrawn on September 30.

Fellows desiring to travel from London to Wisley should take a train from Waterloo to Esher and there pick up the 'bus No. 215 for the Wisley Hut Hotel (about a quarter of an hour's walk from the Gardens). Time-tables of the 'bus No. 215 may be obtained from the London Passenger Transport Board, 55 Broadway, London, S.W. 1 (Tel. Abbey 1234), and for particulars of the trains, the current time-table should be consulted or enquiries made at Waterloo Station (Tel. Waterloo 5100).

R.H.S. Gardeners' Diary, 1943.—Copies of the R.H.S. Gardeners' Diary are now available; early application is desirable. The selling price, including Purchase Tax, is as follows:—

In Pluviusin with back loop and pencil—3s. 4d. post free.

In Morocco leather with pencil (not refillable)—6s. 1d. post free.

In refillable Crocodile Case with card and stamp pockets—11s. 1d. post free.

Refills for Crocodile Case—2s. 4d. post free.

The Society's Examinations.—Candidates who wish to enter for the Teachers' Examination (Preliminary and Advanced) are reminded that the closing date for the receipt of entries is Wednesday, December 16, 1942.

Early ordering of Seed Potatos.—At the request of the Ministry of Agriculture the Society wishes to draw attention to the necessity of ordering seed Potatos early. Last year considerable disappointment was experienced through the late delivery of seed Potatos and the waste caused by frost damage while the seed was in transit. This year the difficulties of moving Potatos from Scotland and Northern Ireland to England and Wales are more acute; there is a considerably greater quantity of seed to be moved and transport facilities next winter will not be so favourable as last year. It is therefore of the highest importance that as large a quantity as possible of seed Potatos shall be moved to their destinations before December, and gardeners and allotment holders are strongly advised to place their orders immediately and take delivery as soon as possible. It will also be of the greatest assistance to the authorities if arrangements can be made for gardeners and allotment holders to pool their orders so that they may be bulked and the transport of many small separate quantities minimized.

It is important that care be taken in storing seed Potatos after they have been delivered. Normally most gardeners do not obtain their supplies until just before planting time, but there is a great advantage in securing seed Potatos early as this makes it possible for the tubers to be sprouted before planting, thereby securing better growth; also tubers that do not grow or that produce only weak, spindly sprouts can be discarded. The requirements for successful storing of seed Potatos are a cool place where the temperature does not fall much below 42° F. It is not sufficient that the store should only be frost-proof, because if the temperature falls to even 2 or 3 degrees above freezing point damage may be caused to the "eyes." It is not necessary that the store should be dark, although Potatos may, if necessary, be kept in the dark for some weeks, but they should be brought into the light in the New Year before the sprouts begin to appear.

WISLEY IN NOVEMBER.

THERE are few outdoor flowers to be seen during the present month, although there is usually something of interest to be found in the greenhouses ; but the great variety of trees and shrubs bearing ornamental fruits or brightly coloured foliage makes a visit to the Gardens worth while.

In the Half-hardy House (Fig. 113) the small pink *Nerine flexuosa* and some of the later scarlet or salmon-pink hybrids are still in bloom, together with the almost indispensable blue *Lithospermum rosmarini-folium*. The tall growths of *Calceolaria Pavonii* reach to the roof, where the first pendent, creamy flowers of *Clematis cirrhosa* are opening. *Cuphea micropetala*, which has been in flower for some weeks, continues to produce its quaint tubular blooms. One of the most striking features of the Temperate House is *Tibouchina semidecandra* with masses of royal purple flowers among velvety leaves. *Epacris ardentissima* with long slender spikes of tubular crimson flowers, *E. impressa* and other species and varieties, are bright for a long period. Other ornamental plants to be seen here now are *Camellia Sasanqua*, *Albertia magna*, a neat shrub with lasting crimson bells, and *Malva umbellata*, a very vigorous shrubby Mallow whose blood-red, clustered flowers are produced in an almost endless succession.

In a narrow border beside the path at the south end of the greenhouses are many unusual, more or less tender plants. One of the latest of these is *Leonotis Leonurus*, a handsome South African Labiate whose vivid orange flowers are due to open now if the weather prove favourable.

From the greenhouses it is but a few steps to the Azalea Garden, where the visitor will find extensive drifts of *Gentiana sino-ornata* in pleasing association with the yellows and reds of the fading foliage of Azaleas and Viburnums. Here also is a shapely specimen of the Flowering Dogwood, *Cornus florida*, in its autumnal crimson and a tall Tulip Tree whose lively green has now changed to clear yellow.

Viburnum fragrans shows a disposition to open a few flowers whenever the weather is at all kind. The large specimen in the Award of Merit Garden opened its first blossoms this year before mid-September, and will probably continue in a floriferous condition until the branches are again leafy, as it has done in past seasons. Close by there is a good plant of *Rhus cotinoides*, which forms a most vivid picture when illuminated by the afternoon sun. In the Wild Garden the American Vacciniums are still bright, as are *Pieris Mariana*, the species of *Enkianthus* in red or yellow, and the taller *Oxydendrum arboreum*. In the early part of the month the fiery pyramid of *Liquidambar styraciflua*, rising above the green of the old Rhododendrons, is very lovely when seen with a background of blue sky.

Most prominent among the trees and shrubs in Seven Acres are the Scarlet Oak, *Quercus coccinea*, which retains its leaves nearly all the winter ; *Parrotia persica*, in innumerable shades of yellow, red and bronze ; and the related *Hamamelis mollis*, passing gradually from yellow to russet. Of the many species and hybrid Barberries one of the finest this year is *Berberis Jamesiana* (Fig. 114), essentially a shrub for the larger garden, where it will form a dense thicket 10 feet high and as much through, every arching branch hung with ample bunches of scarlet, Currant-like berries possessing a peculiar translucent quality. Cotoneasters to be noted in this part of the Gardens are

C. conspicua var. *decora* carrying, on almost prostrate branches, a multitude of berries brightly coloured from September onwards; *C. frigida* and its hybrids, and *C. rotundifolia* with unusually large and late-hanging fruits. Flowers should now be appearing on the uncommon Japanese Cherry *Prunus subhirtella* var. *autumnalis*, which usually has a first crop of blush-pink blossoms at the present season and a second, more liberal, display in March. There are still a few bright spikes on some varieties of the Cornish Heath, and the tiny, pointed buds of *Erica carnea* and *E. darleyensis*, which have been visible for many weeks, are now beginning to show colour.

THE WAR-TIME KITCHEN GARDEN.

NOVEMBER.

Improving the Soil.—Since plants draw from the soil much of their food supply, it follows that any plot of ground will need enrichment from time to time if crops are grown continuously on it. The fertility of the soil can be increased by adding organic or inorganic materials.

The addition of organic matter from time to time is essential if land is to be kept in good condition; animal manure has always been the gardener's standby; now that this is difficult to obtain each grower should make his own supply of humus by building a compost heap. This, if properly constructed, will produce a very good substitute for stable manure. It is not sufficient to pile garden refuse in any odd corner and let it rot. Apart from the fact that such a heap may become offensive and a source of danger, the material does not decay evenly and is not so suitable for digging into the garden. The correct method of reducing waste vegetable matter to a useful manure is to build a heap layer by layer, adding between each some substance, either inorganic or of animal origin, to assist decomposition.

A site should be marked out, of a convenient size for the space available and levelled; on this is laid all the waste material from the garden, weeds, lawn cuttings, dead leaves, soft hedge clippings, stems from the flower borders and the outside leaves of vegetables that are not required in the kitchen or for feeding livestock; the only exceptions are Cabbage stalks and diseased plants, which are better burned. It is important to spread the material evenly and firm it by treading. When a thickness of about 9 inches has been reached it should be sprinkled with a mixture of sulphate of ammonia; superphosphate can be added if available; the correct amount to add is $\frac{1}{2}$ ounce of each for every square yard; water should be added if the material is dry. Basic slag can be substituted for the superphosphate if obtainable, or one of the proprietary articles sold for the purpose can be used instead of the above mixture. A little soil is then put over this first layer and the building of the heap is continued layer by layer as material becomes available. When it gets to about 3 to 4 feet high it is best to stop, finishing with a layer of soil, and to start building a second heap. Soon after completion the first heap should be turned, the sides being brought to the middle, and more water added if it is at all dry. The heap begun in the spring can be dug in when ground is cleared in autumn and the autumn heap will be ready for spring digging.

Another method of increasing the humus content of the soil is by green manuring. Where ground has been cleared and is not required

again for some weeks, for instance after early Peas or Beans have been cleared, this can be sown with a quick-growing crop such as Mustard ; as soon as this shows flower and before frost comes it should be dug in where it has grown.

Humus alone may not be sufficient for soil which is to carry certain vegetable crops and the deficiency is made good by the addition of inorganic materials or fertilizers. Unfortunately a number of substances normally recommended are now very difficult to get, if not quite unobtainable. Three elements are essential—nitrogen, phosphorus and potassium. Nitrogen can be added in the form of sulphate of ammonia or nitro-chalk (where the soil is deficient in lime), both of which are still available. Phosphorus is usually added to the soil in the form of superphosphate or basic slag ; the former is in very short supply and the latter almost unobtainable. All the potassium salts previously used for garden purposes were imported ; a very little is manufactured in this country from flue dust but is unlikely to be on the market, so, for most gardeners, the only source of supply is the bonfire ; all wood ashes should be carefully saved and, if not wanted for immediate use, stored in a dry place until required.

For general use the compost heap that has been treated as described, with the addition of wood ashes, will suffice. But many soils, especially those which are acid or clayey, need regular treatment with lime, and as a rule land newly brought under cultivation should be limed. Besides neutralizing the acid and improving the physical condition of the soil lime is needed by many vegetable crops, especially Cabbages, as it helps the plant to absorb potash, phosphorus and various other elements. Lime should be added in the form of ground chalk or hydrated lime.

Where special crops need extra feeding the gardener who does not understand the use of "artificial" is recommended to get a good general fertilizer ; such fertilizers are scientifically mixed for the purpose described on the packet. Separate fertilizers can safely be used for special purposes ; thus sulphate of ammonia supplies the nitrogen necessary for the production of leaves and is very useful in the early stages of growth, but should not be given at a later stage to plants whose edible portions are the fruits, such as Peas and Beans.

Superphosphate is also useful in the early stages as it promotes root growth and most vegetables are improved by the addition of a little to the soil. Potash is required in the development of fruit, and all fruiting vegetables—Peas, Beans, Tomatos, etc.—need a good supply, so that any wood ashes available should be largely reserved for them.

Some fertilizers damage foliage and it is always wiser, where "artificial" are being applied to growing crops, to sprinkle them a short distance away from the plant and hoe or water in.

Work to be done.—Any vacant ground should be dug, as the weather permits, and growing crops kept tidy, old and decaying leaves being removed at frequent intervals. Complete the earthing up of Celery. Examine Cauliflowers periodically ; they may be protected from slight frost by placing a detached leaf over the curd, or if severe frost threatens, dig up those that have formed curds and place them in a deep frame or hang in a dark shed. *Frames.*—Cleanse and carry out any necessary repairs ; collect leaves and suitable materials in readiness for making a hot bed.

Crops available from the garden in November.—Brussels Sprouts, Cabbages, Cauliflowers, Celery, Leeks, Parsnips, Spinach Beet, Winter

Spinach. *From store*.—Beet, Carrots, Marrows, Onions, Potatos, Shallots, Turnips.

The Fruit Garden.—Where it is intended to plant fruit trees and bushes this winter prepare the ground as soon as possible by bastard trenching the site to be planted. Do not add any bulky manure to the ground to receive tree fruits, but for soft fruits apply a good dressing of farmyard manure below the first spit of soil. Do not plant when the soil is wet but wait until it is in a workable condition. The trees, if they have arrived from the nurseryman, will come to no harm if they are heeled in, thoroughly covering the roots with soil. If the order has not been sent to the nurseryman, do so as soon as possible. The best type of tree for the open garden is the bush tree which has a short stem of about 18 inches before branching takes place. Cordon Apples and Pears are best for planting against walls or fences, and for Plums, Peaches, etc., the fan-shaped tree.

Push ahead with the pruning of Apples and Pears. If much of this work is done now it may prevent it being held up later in the season when the weather may be unsuitable for the work. Prune restricted trees of Apples by shortening the shoots made during the past summer back to a certain number of buds. The extent of this shortening varies, but varieties can be conveniently divided into three groups. Group I consists of varieties which bear fruit on short spurs, and the past season's shoots are shortened back to three or four buds; varieties answering to this treatment are 'Cox's Orange,' 'Ellison's Orange,' 'Lord Derby,' and 'Rev. W. Wilks,' to mention only a few. In Group II the spurs should be left longer, cutting them back to leave five, six or even seven buds; varieties to be so treated consist of 'Laxton's Superb,' 'Lane's Prince Albert,' 'Beauty of Bath' and 'Mother.' Varieties in Group III are really not suitable for trees of restricted habit as they consist of the tip-bearers such as 'Bramley's Seedling,' 'Cornish Gilliflower,' 'Lady Sudeley,' 'Gladstone,' and 'Worcester Pearmain.' The best way to prune such varieties is to thin out crossing and overcrowding secondary branches and to tip the long laterals. Pears should be pruned in the same way as Group I Apples excepting the varieties 'Jargonelle' and 'Josephine de Malines,' which should be treated as tip bearers. The leading shoot of each main branch is cut back by one-third of its length.

Red Currants have the same bearing habit as Apples and are pruned by cutting the side shoots back to three or four buds, shortening the leading growth by one-third.

Cordon Gooseberries are pruned in the same way as Red Currants, but bush Gooseberries are treated differently. The centre of the bush is thinned out by removing overcrowding shoots so as to let in light and air, and the long laterals tipped, but the shorter ones left unpruned.

Do little pruning to Plum trees growing in the open garden; all that is necessary is to thin out crossing or overcrowding shoots or secondary branches. With wall-trained Plums as many as possible of the sturdy young shoots are tied in, replacing wherever possible worn-out secondary shoots. Cut out shoots for which there is no space on the trellis.

In all cases prune with care, cutting back to immediately above a bud pointing in an outward direction. Paint wounds exceeding a quarter of an inch in diameter with white lead paint. Dead and diseased wood must be removed and all the prunings gathered together and burned to convert them into wood ash.

ERNEST HENRY WILSON.

By E. H. M. Cox.

SINCE the start of the nineteenth century plant hunting in China has run in fairly definite grooves: officials of the East India Company who collected the best Chinese florist flowers in their gardens; collectors from Kew and the Horticultural Society who had to keep to the fringe of the seaboard owing to treaty regulations and so had to collect and send home what they could find in Chinese gardens; the French missionaries and others whose work kept them in the interior of the newly opened provinces, but whose inclination or lack of opportunity kept them from introducing new plants to Europe, excellent though they were in collecting herbarium material; travellers like JAMES H. VEITCH and CHARLES MARIES who rushed about from place to place, always anxious to skim the cream off the milk, but in too much of a hurry to do even that properly.

Finally we come to the expert collector who spends most of his life collecting, knows his plants, knows his job and knows his country. He works by routine, visiting an area to see what is to be seen and returning later to collect the seed harvest. He works for two masters, the botanical institution that is interested in herbarium material, and the gardener who is keen to grow new plants. As a rule this kind of dual command works harmoniously and does not clash. The collector sets out with a definite object in view, covers an area that is limited in extent and does not run haphazard over the country. Often collecting is the man's livelihood; always is it taken seriously.

ROBERT FORTUNE was born too soon. There is no doubt at all that he was of the stuff of which the greatest plant collectors are made. CHARLES MARIES had the opportunity but missed it. China was open wide in front of him, but from laziness and lack of tact he did not get on with the Chinese. After getting as far as the Ichang gorges, the gateway to the flower riches of the western hills, he gave up and reported to the Veitchian firm that there was nothing else worth introducing from China. He must have rubbed this into the usually perspicacious VEITCH, because later he was reported to have said to WILSON on his departure for his first trip in China, "My boy, stick to the one thing you are after and do not spend time and money wandering about. Probably almost every worth-while plant in China has now been introduced into Europe."

And yet the VEITCHES were sufficiently wide awake to send WILSON not once but twice, the first time with the main object of introducing the Dove Tree, *Davidia involucrata*, the second time to send home seed of the yellow *Meconopsis integrifolia*.

ERNEST HENRY WILSON was born in Gloucestershire in 1876. After school he entered his apprenticeship in the nurseries of Messrs. HEWITT of Solihull, lately moved to Stratford-on-Avon. In 1892 he entered the Birmingham Botanic Gardens and studied botany in the technical school. In 1897 he went to the Royal Botanic Gardens at Kew but decided to take up the teaching of botany. He was on the point of entering the Imperial College of Science when the Director of Kew recommended him to JAMES VEITCH AND SONS as a collector. He spent six months at their Coombe Wood nursery under their famous

foreman GEORGE HARROW before sailing for China by way of the United States in April 1899.

His first port of call was the Arnold Arboretum, where he made instant friends with Professor SARGENT, a factor that loomed very large in his future life. He crossed the Pacific and reached Hong-kong on June 3. Either WILSON or JAMES VEITCH had decided very wisely that it was most important to get AUGUSTINE HENRY's views and advice before starting off on his main trip. As HENRY at this time was stationed at Szemao in south-western Yunnan, a Sabbath day's journey from the eastern coast, WILSON spent the early part of the winter of 1899-1900 in visiting him and nearly had to give up owing to sporadic trouble at Mengtze on the way there. But he persevered and not only spent a profitable month or two loading himself with as much of HENRY's plant lore as possible, but collecting on the way back the lovely *Jasminum primulinum*.

At HENRY's suggestion he concentrated to begin with on the country round Ichang on the Yangtze in western Hupeh, where HENRY had himself been stationed. It was this country and Szechuan that WILSON made particularly his own as a plant collector. Much of the neighbourhood of the Hupeh-Szechuan border consists of series upon series of limestone ranges with deep valleys between. A very sparse population and means of communication almost non-existent make this part of the country extremely difficult of access ; but it contains one of the most magnificent tree and shrub floras of the world.

WILSON was an exceedingly good photographer, but he had one peculiarity : he would never travel with anything less in size than a whole-plate camera, and also a portable dark room. This he kept up through the whole of his life. The consequence was not only a great weight to be carried through some of the most difficult tracks in western China, but also the difficulty of taking photographs of plants at unusual angles. His first investigation of the tree he set out to find, *Davidia involucrata*, is a good example of the thoroughness with which he worked. On May 31, 1900, he wrote in his diary :

"Go over and investigate the *Davidia* trees and the forests generally. Crossing a narrow neck a woodcutter's circuitous path leads us down to a narrow defile through a fine shady wood. Ascending a precipice with difficulty, we soon reach the *Davidia* trees. There are over a score of them growing on a steep, rocky declivity ; they vary from 35 to 60 feet in height, and the largest is 6 feet in girth. Being in a dense wood they are bare of branches for half their height, but their presence is readily detected by the numerous white bracts which have fallen and lie strewn on the ground. The tree starts up from below when felled ; indeed, it naturally throws up small stems after it gets old. The bark is dark and scales off in small irregular flakes. By climbing a large *Tetracentron* tree growing on the edge of a cliff, and chopping off some branches to make a clear space, I manage to take some snapshots of the upper part of the *Davidia* tree in full flower. A difficult task and highly dangerous. Three of us climb the tree to different heights and haul up axe and camera from one to another by means of a rope. The wood of *Tetracentron* is brittle, and the knowledge of this does not add to one's peace of mind when sitting astride a branch about 4 inches thick with a sheer drop of a couple of hundred feet beneath. However, all went well, and we drank in the beauties of this extraordinary tree."

It is difficult from WILSON's writings to work out the exact itineraries of his various journeys. His main book on his travels, *A Naturalist in Western China*, published in this country in 1913 and re-issued in 1929 in the United States under the title *China, Mother of Gardens*, if read in a careless fashion seems like the narrative of one consecutive journey. Actually it is made up of sections from his itineraries of 1903-1905, 1907-1908 and 1910-1911.

As has been stated earlier, his first trip for the Veitchian firm was specifically to introduce *Davidia involucrata*. Actually, in the first year (1900) he did not move far from Ichang. That he was able to move about at all was wonderful, as this was the period of the Boxer trouble, and Hupeh and Szechuan at the best of times are not in the habit of welcoming foreigners with open arms. Even the vastly more experienced HENRY in the south-west of Yunnan, where Chinese influence was not so great, was almost completely immobilized. Yet in those first two years WILSON did travel about, certainly as far as HENRY's excursions in the immediate neighbourhood. He spent a certain amount of time on the Yangtze in those curious combinations between conveyance and houseboat, a not very safe form of amusement in the Gorges. Once he was actually wrecked and lost all his belongings, including his camera and hundreds of plates.

When the temper of the people had calmed down, he moved further afield. He again followed HENRY's footsteps both south and north of the Yangtze. North was far more important, for north-western Hupeh consists of an extraordinary welter of limestone hills and valleys with one of the finest ligneous floras in the world: he frequently mentions collecting specimens of 25 or 30 different woody plants in one day. Here is a sample description of a day's march made through the same country, but not by the exact same route, in 1910:

"The next morning we made an early start in order to cover the 60 li between Hsin-tientze and Mao-fu-lien. Immediately on leaving we traversed an old wood especially rich in species of Maple. *Davidia* and Beech are also common, whilst the interesting *Cornus sinensis* occurs sparingly as a thin tree 60 feet tall. *Pinus Armandi* is present, but conifers generally are very scarce in this particular locality.

"We meandered around the mountain-sides, by a tortuous ascending path, until we reached a gap in the ridge and crossing over made a breakneck descent of a couple of thousand feet. A new kind of Poplar, having the young foliage bronzy-red, was common on all sides, and in the descent I gathered *Primula violodora*, *Rhododendron Augustinii*, *Acer griseum*, and a pink-flowered *Staphylea*, the last two both small trees. The most interesting find, however, was a new *Hydrangea* [*H. Sargentiana*], a shrub 5 to 6 feet tall, with stems densely felted with short bristly hairs and large, dark green leaves with a velvet lustre—in foliage alone this species is strikingly handsome."

A good collection of really first-class garden plants to see in one day.

One gathers that the Veitchian purse was not inexhaustible, and that this prevented travelling further afield over a longer period. Nevertheless when he returned to England in April 1902 he brought with him from the collection of 1901 alone the seed of 305 species, herbarium material of 906 species, in addition to 35 cases of bulbs and living roots.

Here are some of the best known introductions from this first expedition :

Abies Fargesii.

Acer Davidii.

Acer griseum.

Actinidia chinensis.

Astilbe Davidi.

Buddleia Davidi (variabilis) magnifica.

Clematis Armandii.

Clematis montana rubens.

Cotoneaster Dammeri.

Cotoneaster Dielsiana.

Davidia involucrata.

Dipelta floribunda.

Magnolia Delavayi.

Malus theifera.

Potentilla fruticosa Veitchii.

Rhododendron discolor.

Rhododendron Fargesii.

Senecio clivorum.

Stranvaesia Davidiana undulata.

Styrax Hemsleyanum

Viburnum rhytidophyllum.

WILSON left England again in January 1903 for the second expedition on behalf of the firm of VEITCH. This time his main object was the introduction of *Meconopsis integrifolia*. Glowing accounts of its beauty had reached home, possibly from A. E. PRATT, the naturalist, who had visited Tatsien-lu a year or two before.

This time he made his headquarters far further west at Kiating-fu in Szechuan on the Min river, about halfway between the junction of the Min and the Yangtze and Chengtu, the capital of the province. This was an excellent centre and an important town. It lies just to the east of the famous Mount Omei ; communications are easy to the north through the great Chengtu plain, one of the most highly cultivated areas of China ; Mupin and the other feudal states of the Tibetan marches are not far to the west ; and it lies on one of the main roads to Tibet by way of Tatsien-lu and Batang.

WILSON made good use of his opportunities. In two collecting seasons he travelled an enormous mileage. He went three times to Tatsien-lu, each time varying his route so as to cover more ground. He also went twice to Sungpan, the furthest town in north-western Szechuan, very near the Kansu border. This was a very far cry, at least 300 miles from Kiating. Here again he varied his route when in the hills. Once he very nearly starved himself and his followers to death by following an almost unknown track through terrible country in the vilest weather. It was through an almost uninhabited tract, and the few inhabitants were on the verge of starvation themselves owing to the bad season. Between these extraordinary rushes WILSON managed to explore Mount Omei thoroughly.

Much of these two years was spent at a much higher elevation than western Hupeh, where the heights rarely reached 10,000 feet. This question of altitude meant that a great deal of his time was spent above the tree line, and it was on this expedition that he collected and introduced most of the herbs, which at the best were only of secondary interest to him, except Lilies. He was, however, much impressed by the sight of thousands upon thousands of plants of *Meconopsis integrifolia* and also of the scarlet *M. punicea*, which he saw both separately and together.

With his headquarters so close at Kiating-fu WILSON visited both Mount Omei and a neighbouring mountain called Wa-shan. These, and a third hill, Wa-Wu-shan, which he climbed in 1908, form the apices of a curious triangle west of Kiating-fu. Although many miles apart, they are curiously alike with flat tops, many square miles in extent in the case of Wa-shan, and impressive cliffs, over 2,000 feet high, on one side of Mount Omei. On Wa-shan the cliffs are in a series

of gigantic steps, and the final three below the top have to be surmounted by ladders. Between these three mountains lies a welter of crags and gullies, such a wild stretch of country that the Chinese call it the Laolin or Wilderness.

The climate of this triangle is extremely wet. As most of the rock is limestone, it will be understood what a wonderful flora the three mountains contain, particularly Mount Omei and Wa-shan. Mount Omei is one of the three holiest Buddhist mountains in China with temples on every picturesque vantage point and a constant stream of pilgrims from all over China and even as far afield as Nepal climbing its 11,000 feet. Wa-Wu-shan also basks in reflected holiness. For two months of the year it has a small share of pilgrims; for the other ten it is completely neglected. Wa-shan also has a temple on its summit.

At the time of WILSON's visit (he climbed Wa-Wu-shan and crossed the Laolin in 1908) Mount Omei was well wooded because it was a holy mountain; but both Wa-shan and Wa-Wu-shan had been more or less denuded of their big trees by the charcoal burners, the summits consisting of dense thickets of Bamboo. Nevertheless WILSON constantly mentions the numbers of the shrub flora. What is more remarkable is the fact that he states quite clearly that both Mount Omei and Wa-shan with their stupendous cliffs are formed of hard limestone, as is most of the Wilderness, and yet he found a number of Rhododendrons on them, mostly on Wa-shan. This is so contrary to the usually accepted theory that Rhododendrons will not thrive on limestone that a list of those found on Mount Omei and Wa-shan is given.

RR. ambiguum, argyrophyllum, calophytum, concinnum, Faberii, insigne, moupinense, ochraceum, Sargentianum, Searsiae, strigillosum, villosum, Williamsianum, Wiltonii.

It is often stated that FORREST later found a number growing on hard limestone east of Tali, which only bears out that hard limestone, either magnesium or carbonate, is not so indigestible to Rhododendrons as is commonly imagined.

Other trees and shrubs of these hills are *Acer Davidii*, *Actinidia chinensis*, *Abies Delavayi*, *Tsuga yunnanensis*, *Sorbus munda*, *Rosa omeiensis*, *Philadelphus Wilsonii*, *Cassiope selaginoides*, and so on.

WILSON visited Wa-shan again in 1908. In 1903 he climbed Wa-shan in June and Mount Omei in October.

On the whole this second Veitchian expedition yielded a dwarfer harvest than the first. Here are some of his introductions from this second expedition:

Berberis Gagnepainii, verruculosa, Wilsonae.

Malus toringoides.

Meconopsis integrifolia, punicea.

Populus lasiocarpa.

Primula Cockburniana, Veitchii, vittata.

Rheum Alexandrae.

Rhododendron calophytum, intricatum, lutescens, orbiculare, Sargentianum, Souliei.

Rosa Moyesii, Willmottiae.

Thalictrum dipterocarpum.

Viburnum Davidii.

On WILSON's return in March, 1905, from this second expedition he spent the rest of the year in working over his plants, and in a much

needed holiday. Early in 1906 he was appointed a botanical assistant at the Imperial Institute. Before he had time to shake down in his new post, Professor SARGENT, who had kept a watchful eye on him from the first, asked him to undertake a third trip to China, this time on behalf of the Arnold Arboretum. WILSON went to the United States early in 1907 and sailed again for China in December.

As soon as he reached Ichang he left at once for his old hunting ground amongst the limestone gorges of Western Hupeh. But on this occasion, under the wise generalship of Professor SARGENT, he had a far freer hand to go where he willed and do what he liked. As SARGENT was head of an arboretum, it was obvious that WILSON must put woody plants first; and he felt that no place could give him such a rich harvest as that difficult section of country. Later he moved again into Szechuan, and from Chengtu made another journey to Tatsien-lu, but this time by a more northerly route through the semi-independent feudal states of Wassu, Wokji and Mupin. The last, of course, was most important botanically, and it was here that WILSON was able to collect seed of so many plants first discovered in the same area by DAVID many years before. From Mongkong, the chief centre of the feudal states, he bore south-west until he had crossed the Ta-p'ao-shan pass, a very rough journey, and then reached Tatsien-lu from the north.

Before he returned home he found time to visit Wa-Wu-shan, the third of the remarkable hills west of Kiating; the others, you will remember, are Mount Omei and Wa-shan. On his way back to Kiating he crossed the Laolin (Wilderness) from north to south, possibly the only European to do so. During the entire journey of only about 70 miles over vile tracks, much of which had been swept away by fierce rainstorms when he had to wade for long distances on the edge of the streams, he never saw anything beyond a radius of 50 yards owing to the mist and rain.

WILSON returned to England in May, 1909, and to the Arnold Arboretum in September of the same year. He had been very successful in collecting a fine harvest of seed, and among his introductions of these two years are:

Berberis Sargentiana.

Buddleia asiatica.

Cercidiphyllum japonicum var. *sinense*, the largest broad-leaved tree he found in that area.

Cornus kousa sinensis.

Cotoneaster divaricata, salicifolia var. *floccosa.*

Evodia hupehensis.

Exochorda Giralddii var. *Wilsonii.*

Hydrangea Sargentiana.

Lonicera nitida.

Magnolia Wilsonii.

Rhododendron Augustinii, Williamsianum.

Rosa Helenae.

Salix magnifica.

Spiraea arborea.

Staphylea holocarpa.

Styrax Wilsonii.

Viburnum Henryi.

Early in 1910 he was again in Ichang on his fourth and last expedition in China. This time he again made for north-western Hupeh,

but altered his itinerary and travelled westwards for about 200 miles parallel to the Yangtze, but about 50 miles to the north of it. This brought him through the limestone hills of Hupeh out on to the red sandstone of Szechuan. The difficulty of the country is shown by the fact that it took WILSON and his experienced band of coolies twenty-two days to walk the 200 or so miles. In eastern Szechuan the country was kinder and also hotter, for Szechuan, or much of it including the Chengtu plain, is semi-tropical.

From Chengtu he made another trip to Sungpan in the far north-west, this time by a third route through very broken country that lay between his two previous routes. It was on this trip that an enormous landslide sweeping down a mountainside carried his sedan chair hundreds of feet down the precipitous bank to the river below. WILSON managed to jump out, but a rock caught and broke his leg. The camera legs were utilized as splints. After a long trek he was carried to a medical missionary. The leg healed badly, and it nearly had to be removed. But he ultimately left a Boston hospital as fit as ever with one leg slightly shorter than the other.

Although this expedition had to be cut short, it was exceptionally important, as it was during 1910 that WILSON collected and sent to America hundreds of bulbs of, perhaps, his greatest find, *Lilium regale*, the Regal Lily.

"To garden lovers everywhere these valleys are of special interest, inasmuch as they are the home of many beautiful Lilies. Each of these valleys has species or varieties peculiarly its own, which range up to about 8,000 feet altitude, yet whilst very local these Lilies are numerically extraordinarily abundant. In late June and July it is possible to walk for days through a veritable wild garden dominated by these beautiful flowers. In the Min Valley the charming *Lilium regale* luxuriates in rocky crevices, sun-baked throughout the greater part of the year. It grows 3 to 5 feet tall, and has slender leaves crowded on stems bearing several large funnel-shaped flowers, red-purple without, ivory-white suffused with canary-yellow within, often with the red-purple reflected through, and is deliciously fragrant."

Other plants of that fourth expedition are :

Arundinaria Murielae.

Berberis Vernae.

Lilium Davidii, *Sargentiae*, *Willmottiae*.

Picea asperata.

WILSON's next trip to the East was in 1914, when Professor SARGENT (WILSON was now in the permanent employ of the Arnold Arboretum) sent him for almost a year to Japan. On this more civilized expedition he was accompanied by his wife and daughter (commemorated respectively in *Rosa Helenae* and *Arundinaria Murielae*). His main study during this year was the flowering Cherry, which afterwards became a prime favourite of his. It was also on this trip that his friend, the nurseryman H. SUZUKI, introduced him to the Kurume Azalea, which WILSON later did so much to popularize. He saw them first in the nursery district of Hatagaya, a few miles north of Tokyo. "There in a garden I saw thousands of tiny plants bearing white and coloured flowers of nearly every hue."

In 1918, when he again visited Japan, SUZUKI was able to take him to the city of Kurume on the island of Kyushu. This was the headquarters of the Kurume family. WILSON wrote : "I went prepared to see a display of blossoms, but the entrancing beauty of myriad

delicately coloured flowers clothing a multitude of shapely grown plants surpassed my most sanguine expectations. Most of the plants were trained into low standards, each about 20 inches high with flattened or convex crowns some 24 inches through, and were monuments to the patience and skill of the Japanese gardener."

The Kurume Azaleas were originated by a Japanese, Motozo SAKAMOTO, who lived in Kurume about 1815. The parent came from sacred Mount Kirishima. SAKAMOTO collected several varieties, and raised and selected his own seedlings.

It is unfortunate that the Kurume Azalea, lovely though she is, has not borne out the early promise either in the British Isles or in the Northern United States. She is not quite hardy enough to make a good show, except a few varieties in most favoured gardens.

In 1917 WILSON began his last expedition to the Far East. He began by exploring those curious islands of Liukiu and Bonin which were so often made a port of call in the early days of exploration in the Japanese seas and which are still so little known. Then he went on to Korea and the volcanic islands of Dagalet and Quelpaert, all very little known by Europeans. In Korea he spent the latter part of 1917 and was able to introduce one or two excellent plants from there, among them *Astilbe koreana*, *Forsythia ovata*, *Rhododendron Weyrichii*, *Spiraea trichocarpa* and *Stewartia koreana*.

In January, 1918, he went to Formosa, primarily to collect *Taiwania cryptomerioides*. He climbed Mount Morrison, the highest peak on the island, more than 13,000 feet, and when he returned in the autumn to collect the seed he was allowed to cross the extraordinary cliffs at the north-east end of the island. These rise so steeply from the sea as to be nearly sheer for thousands of feet. Yet such is the climate and formation of the rock that the upper thousands of feet contain an interesting and abundant flora clinging to the face of the rock. There is a difficult and dangerous track high up these cliffs, and this WILSON was allowed to go along, certainly the first European to do so.

Apart from the *Cryptomeria* he introduced *Lilium philippinense formosanum*, *Lilium speciosum* var. *gloriosoides*, and *Pieris taiwanensis*.

In 1919 WILSON was appointed Assistant Director of the Arnold Arboretum. From 1920 to 1922 he made a tour of Australasia, South Africa and India. In 1927 he was appointed Keeper of the Arnold Arboretum on the death of Professor SARGENT. On October 15, 1930, he and Mrs. WILSON were killed in a motor accident near Worcester, Massachusetts.

In the last few years gardeners have tended to forget all that WILSON has done for horticulture by introducing new plants. In this plant collecting business it is quite impossible to place individual collectors in order of merit or precedence; but I would say that WILSON was equal to the greatest. In some ways he has been handicapped. The firm of JAMES VEITCH AND SONS were nearing the end of their existence when he went out to China for them. The directors were slightly imbued with MARIES' idea that everything good in China had already been collected. In addition, the nursery stock at Coombe Wood was sold up just as his original introductions were coming to the flowering stage. No effort was made to propagate them; consequently many of his plants, such as *Rhododendron insigne* and *Staphylea holocarpa rosea* have been extremely rare, and have only lately come into commerce.

If he had collected after the last war when gardeners became enthusiastic about exotics—and unless there is general enthusiasm

there is no incentive towards intensive propagation—many of his introductions would have been far more popular than they are to-day. His best work was undertaken just a generation too early.

WILSON in his day certainly did much to popularize good gardening in the United States both by precept in the excellent way in which the Arnold Arboretum was run, by the keen interest which he took in the Massachusetts Horticultural Society, and in his writing. He was a writer of many parts: he could be severely technical in *The Lilies of Eastern Asia*; he could give information clearly, readably and without frills in *A Naturalist in Western China*, one of the most informative books on botanical exploration ever written; he could be as popular as you like writing for the large, sprouting American gardening public in *Aristocrats of the Garden* when publicity gave him the nickname of "Chinese" WILSON, a name which he good-humouredly put up with and secretly disliked; he could lecture extremely well. But in whatever mood he was he always insisted on being accurate, and he rarely made a misstatement.

THE GROWTH OF ROSE STOCKS.

By L. G. G. WARNE, M.Sc., Ph.D., and L. FOTHERGILL, M.Sc.
(Botany Department, Manchester University.)

THERE is little accurate information available as to the vigour of the Roses commonly used as stocks and of their effect on the growth of scion varieties worked on to them. Because of this in a cultural experiment designed to yield information of the effect of nutrient deficiencies on the growth of Rose stocks, periodic measurements of growth of various stocks have been made with a view to classifying them on a basis of vigour of growth.

Before planting, in January 1938, the trees were pruned to a uniform shape. The shoots were reduced to two buds on each of three branches, any branches in excess of this number being completely removed. The root system was pruned so as to leave five roots each about 4 inches in length and each carrying a little fibrous root. The pruned trees were planted in 6-inch waxed pots and received culture solutions of various compositions. A further set were planted in pots of compost of the composition: peat, 1 part; fibrous loam, 1 part; and sand, 1 part, and these trees received water only and acted as a control to the sand culture experiments. After planting the bushes were kept in a cold frame until April and then put outside in a cinder bed. All the trees made satisfactory growth. It is not proposed to discuss here the effect of the nutrient conditions on the growth of the stock but only to point out differences between the vigour of the different stocks. It is possible to do this as no evidence was obtained of any differential response of the various stocks to nutrient deficiencies.

The stocks treated in this way were those known commercially as 'Kokulensky,' 'Multiflora,' 'Laxa,' 'Brog's Canina,' 'Rugosa' and 'Polmeriana,' and it is not proposed at this stage to discuss the problems either of Rose stock nomenclature or of the systematic relations of these stocks.

With a view to examining both the total growth and the periodicity of growth of the stocks weekly measurements of shoot lengths were made, data being collected from April 11 onwards, by which date some of the stocks, especially 'Brog's' and 'Multiflora,' had made appreciable growth. From these data growth curves for the various

stocks were obtained which show graphically the distribution of growth throughout the season. One set of these growth curves is reproduced here and examination of it shows that on the basis of growth characters the stocks 'Brog's' and 'Multiflora' are sharply separated from the rest, showing both a greater final shoot length and an extended period of shoot growth. In order to obtain a better measure of total shoot growth, at the end of the season, length measurements of all the shoots (main shoots and laterals) were made. This gives a fair measure of total growth, although no account is taken of shoot diameter or of the amount of dry matter produced. The final total shoot lengths obtained in this way are given below.

	Shoot length in cms.
'Kokulensky'	107
'Multiflora'	204
'Laxa'	112
'Brog's Canina'	230
'Rugosa'	88
'Polmeriana'	113

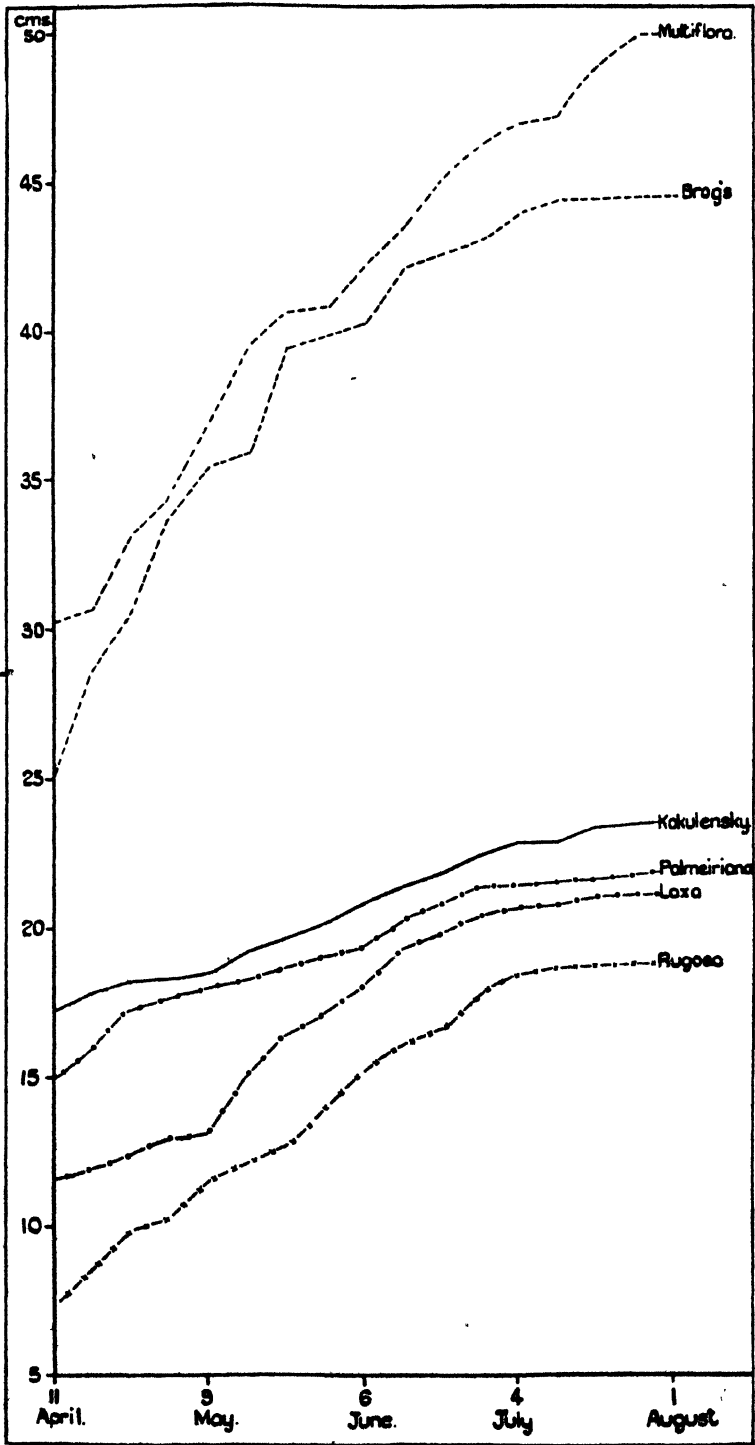
These values are the means for all the trees growing under the varying nutrient conditions, and statistical analysis of the data shows that, whilst the stocks 'Brog's' and 'Multiflora' do not differ significantly from each other, they are both significantly more vigorous than any of the other stocks tested. 'Polmeriana,' 'Laxa,' and 'Kokulensky' form an intermediate group not differing significantly from each other, whilst 'Rugosa' is the least vigorous of the stocks; but the difference in shoot growth between 'Rugosa' and the intermediate group of stocks just fails to reach the level of significance. However, it appears likely that on the basis of total shoot growth the stocks fall into groups as under :

Most vigorous	'Brog's,' 'Multiflora.'
Intermediate	'Laxa,' 'Kokulensky' and 'Polmeriana.'
Least vigorous	'Rugosa.'

The data demonstrate clearly that significant differences in the total shoot growth and in the periodicity of growth of the various stocks do exist, but it is by no means clear that the stocks are able to impress their growth characters on scion varieties budded on to them. Meagre data available from a single experiment suggest that in some cases at least they may not be able to do so. In one experiment where bushes were used of the variety 'Etoile de Holland' budded on to the three stocks, 'Polmeriana,' 'Rugosa,' and 'Laxa,' the total shoot growth of the scion in the first season was as under :

Stock.	Shoot growth in cms.
'Rugosa'	78
'Laxa'	74
'Polmeriana'	74

The small differences observed here are of no significance, and there is no indication that 'Rugosa' exerts any dwarfing effect on the scion budded on to it. Unfortunately the experiment did not include any bushes of the vigorous stocks 'Multiflora' and 'Brog's,' and perhaps, when further experiments which include bushes on these stocks are made, it will be possible to demonstrate a significant effect of the stock on the growth of the scion.



(See p. 360.)

ERICACEAE AND VACCINIACEAE.

SHRUBS OF GARDEN MERIT AND INTEREST.

By A. T. JOHNSON.

(Figs. 115-119.)

THERE exists a widespread impression that ericaceous plants, other than Rhododendrons and the true Heaths, belong for the most part to the realm of the specialist, that their garden value is negligible, their tempers sour. There may be some truth in this, but not very much when it is admitted, as it must be, that garden value does not of necessity imply only spectacular diversion. Within the term must surely be included that peculiar appeal which certain classes of plant, notably among Ericaceae, exert upon many of us, though they may possess little or nothing of garden value in the generally accepted sense. Even the difficulties which some of them present may serve as a stimulus to their culture rather than a deterrent, so much so that not a few of us might feel that the game would lose much of its zest were *Epigaea repens* suddenly to acquire docility and responsiveness where once it was refractory and dour. However, I propose here mainly to confine these notes to some of those Ericaceae and Vacciniaceae which possess general garden value, including beauty of foliage, blossom, fruit and autumn colour. All these are distinctly economic in so far as labour is concerned. They are usually long-lived, remarkably pest-free, require practically no pruning, and, if given a reasonable start in non-limy soil, cultural aid will be of no account.

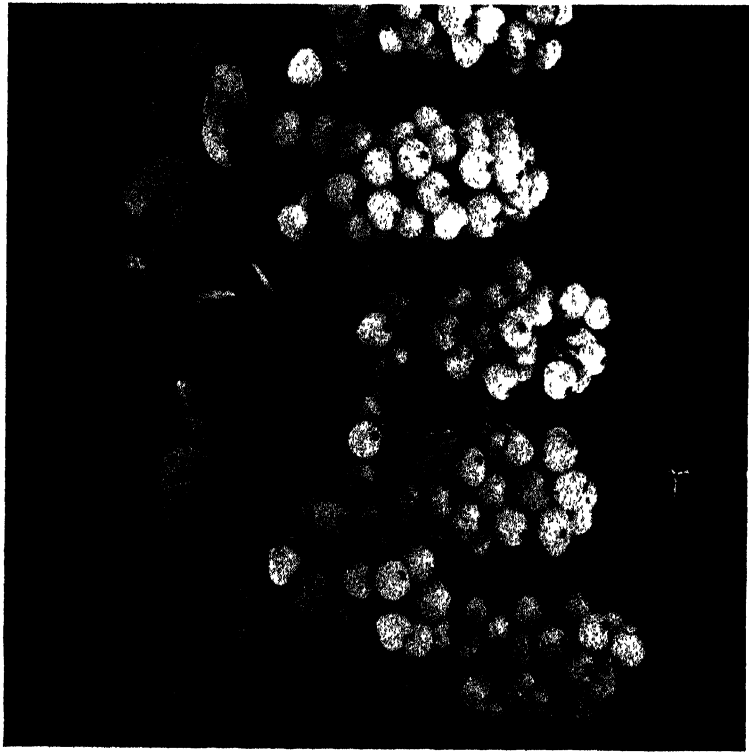
The *Enkianthus*es we have always held in high esteem, whether they are grouped alone or set out among the lowlier Rhododendrons, these latter appreciating their light shade and, by way of return, helping to keep cool the roots of their companions. Of the seven or eight kinds we grow all came through the zero frosts of 1939-40 without injury, and all flower with the utmost profusion every May and June. Although most of these shrubs are, in the opinion of some, no more than geographical forms of *E. campanulatus*, and have many features in common, they are individually sufficiently distinct in the garden to suggest the specific rank which some botanists accord them. Erect and slender in habit, thus taking little room, with a height of six to ten feet, their branches are frequently whorled while the flowers are a wide-mouthed bell- or pitcher-shape. These, hanging in racemes or clusters, may be five-eighths of an inch across, as in *E. himalaicus*, but in most others they are about half as wide, the colour ranging from ivory or primrose to rose-tinted yellow and the full-toned red of *E. cernuus rubens* and *Palibinii*. These two are probably the most desirable for anyone who has to limit his numbers, but *E. perulatus (japonicus)* with pale primrose flowers is equal to them in leaf-colour, for which alone the *Enkianthus*es can claim a prominent place in any shrub garden. In a few of them we get a good yellow, but in the three last mentioned the leaves become a brilliant scarlet before falling and they are by no means fleeting in their splendour.

For many years I have had good reason to rank *Daboëcia cantabrica* among the best of ericaceous plants. Hardy enough to endure the severe trials of the last few winters, a good doer in a free soil, with full exposure, this admirable Heath gives four months of its large-belled spikes. Indeed, the white variety, which exceeds the type in size of flower and the brighter green of its foliage, will begin in May and not cease until mid-October, and that on banks of poor soil without any



Photo, N. K. Gould

FIG. 113 - HALF-HARDY HOUSE AT WISLEY
(See p. 347)



Photo, N. K. Goddard.]

FIG. 114 —BERBERIS JAMESIANA
(See p. 347)

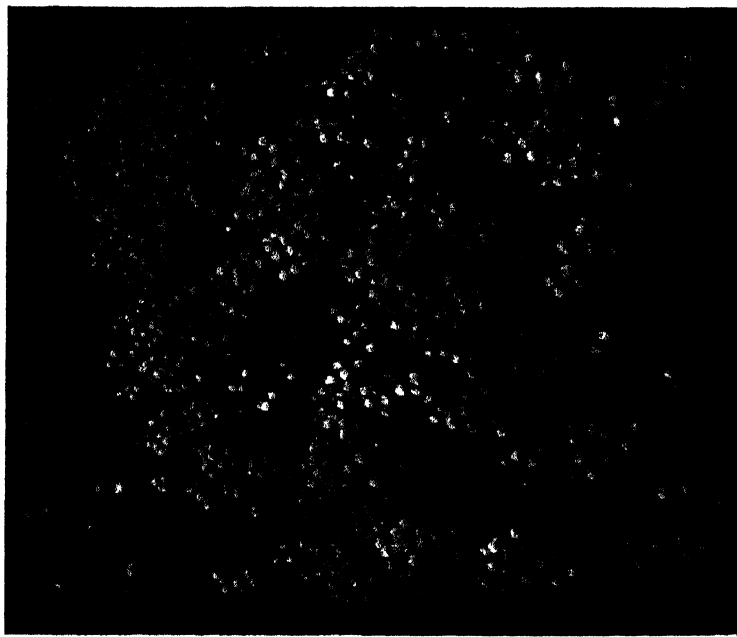


FIG 115 —DABOECIA CANTABRICA VAR. ALBA.
(See p 362.)



FIG 116—GAULTHERIA FORRESTII IN FLOWER.
(See p 364)



FIG 117—VACCINIUM STAMINEUM.
(See p. 366.)

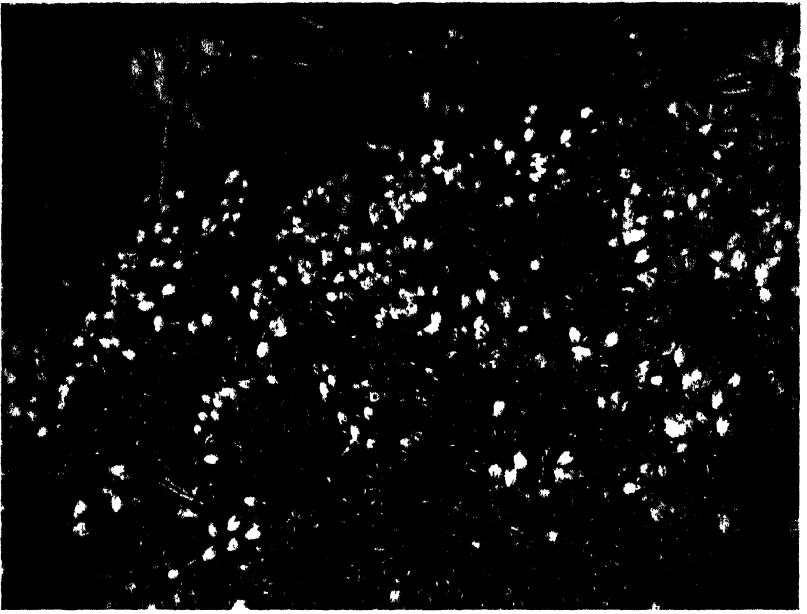


FIG. 118 *PHYLLODOCE COERULEA*.
(See p. 363.)

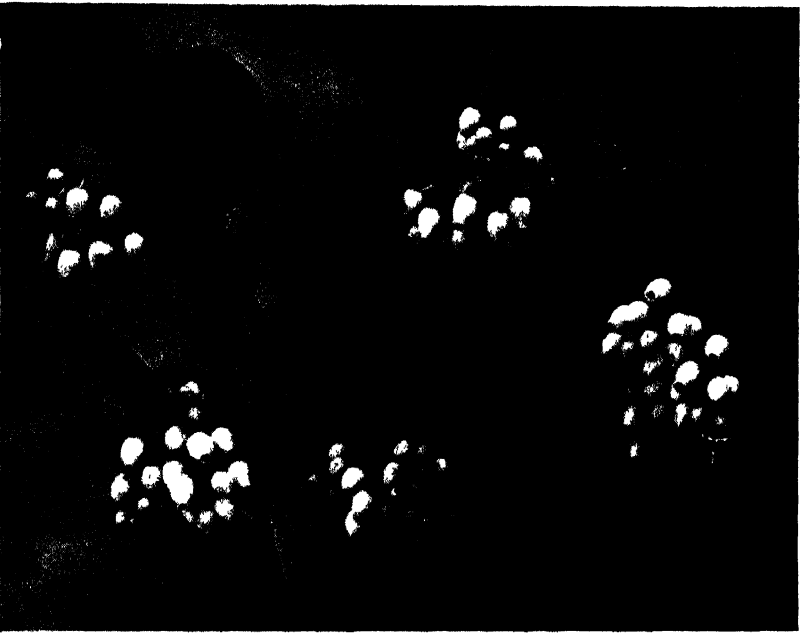


FIG. 119.—*ARCTOSTAPHYLOS MANZANITA*.
(See p. 364.)



From a painting by Liliun Snelling.]

FIG. 120.—*CARYOPTERIS* × *CLANDONENSIS*.
(See p. 366.)



Photo, N. K. Gould.]

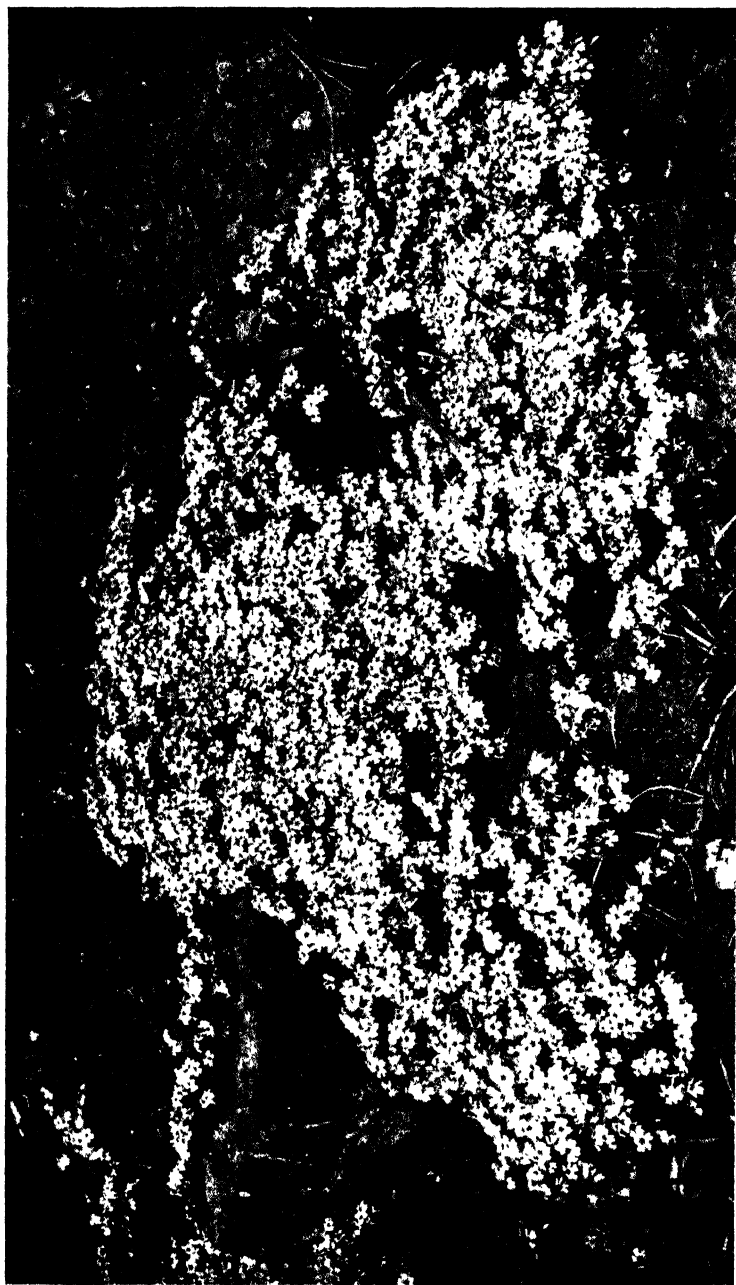
FIG. 121.—*OURISIA MICROPHYLLA* AT WISLEY.

(See p. 370.)



Photo, N. K. Gould.

FIG 122 —*CAMPANULA* *HAYLODGENSIS* AT WISLEY.
(See p. 370)



Photo, N. K. Gould

FIG. 123.--*PHLOX SUBULATA*

A good plant for the Rock Garden; given the Award of Garden Merit in 1939

cultural aid. This fine variety is exceeded in size of bloom by the rosy *globosa*, but while we may grant full marks to these two and include the bright crimson-purple *purpurea*, I often think the typical bluish-lilac worthy of more recognition than it gets. In that little season before the later flowering of *Erica cinerea* and *E. vagans* it comes in very attractively on the drier Heath slopes. *Daboecia azorica*, the latest addition to the family, we have found quite reasonably hardy, and its ruby-crimson bells, on spikes of some six inches, have a distinction of their own. I have observed, however, considerable variability in seed-raised plants, both in the colour of the flowers and hairiness of the foliage, this quite apart from the results of hybridization with *D. cantabrica* which is said to have occurred, but of this latter I have had no personal experience.

Although the shrub long known as *Phyllodoce empetriformis* is undoubtedly the best of the family in garden merit, with *P. nipponica* as runner-up—both of them plants of the utmost quality and charm—*P. coerulea* possesses an interest due, it is likely, to the fact that it is the only native representative of the genus, though nearly extinct, and perhaps more difficult than any other. Whether its very limited natural range in Scotland may indicate a peculiar fastidiousness in choice of location others must decide if they can, but it seems that success with the plant in any garden at all suited to it depends very largely upon the position selected for it. At all events one plant of ours put in over thirty years ago is still alive, but its progeny, raised from cuttings, have been a continuous disappointment. Oddly enough, the same species procured from Japan has prospered exceedingly, but it differs from the Scottish native in its much more lowly and denser mat-forming growth and in bearing flowers in shorter, blunter spikes. These flowers, egg-shaped, much contracted at the mouth, are of the same cool rosy-mauve as those of the native and, like the latter, appear in late May with a partial secondary yield in autumn.

At the time of writing (late August) *Oxydendrum arboreum* is already surrendering its green and assuming those rich shades of scarlet and blood-red which it will retain with such striking result throughout the autumn. Contemporary with this change is the appearance of the bell-like flowers carried in a six- to nine-inch panicle of racemes, and since the entire inflorescence—stalks, calyces and corollas—is white the sprays, which last long enough to be backed by the full red of the foliage, are singularly effective. Whether mature trees of this species present both flower and leaf colour at the same time I do not know, but our own specimens and others seen, as yet mere shrubs and grown with considerable exposure to sun, invariably do. Yet another remarkable fact regarding *O. arboreum* is that, although it will eventually make a tree of thirty feet and more, it will begin its flowering career when no more than an infant of, say, four feet. If one is right in assuming that this tree is propagated by seed the peculiarity appears still more surprising.

Pieris (Xolisma) Mariana, the first, I think, of its lovely family to be introduced, but one of the most uncommon, is also deciduous, and before shedding its foliage the leaves rival those of *Oxydendrum*, not only in their intense blood-crimson but in their staying quality. This latter is a matter of so much importance where autumn colour is concerned that *P. Mariana* merits generous grouping. Nor is that all, for the plant is undoubtedly perfectly hardy, and its white flowers, drooping, cylindrical and over half an inch long, are very beautiful and, unlike those of most *Pieris*, do not appear until after the spring

frosts. Though the comparatively recent *P. taiwanensis* (WILSON, 1918) appears to be less spring-tender than *P. japonica*, we do not feel that the esteem which the latter has so long enjoyed is to any degree shaken by the newcomer. The amber leaf tufts which succeed the flowers are weak in colour compared with the glossy bronze of *japonica*, and while there may be something to be said for the erect panicles of WILSON's plant these lack the peculiar elegance of the pendulous racemes which adorn the other. Moreover, the flowers of *P. japonica* are richly fragrant and the crisp white bells have a good deal of red about calyx and stalk, this imparting an emphasis to the white panicles which is absent in those of *taiwanensis* with their setting of green. However, comparisons are perhaps odious, for *P. taiwanensis* is undoubtedly a choice shrub of great merit. *P. Forrestii*, the original introduction, we have never found a free bloomer, but it makes full amends for that failing by being the most brilliant of the family in the colour of its young wood and leaves, these being an intense carmine for several weeks. Our oldest specimen of eight feet was cut to the base by frost two years ago, but it has sprung up again and its basal shoots, appearing in succession, have given us its brilliant colour throughout the growing season. This *P. Forrestii* is not so winter-proof as *P. formosa*, but it is able to stand up to 20–25 degrees or so of frost with us, which is more than F.8945 and one or two more of FORREST's can endure.

The frost (3–4 degrees below zero) which injured the above Pieris killed *Arctostaphylos Manzanita*, about six feet high, but I think this shrub should be able to withstand as much severity as *Arbutus Menziesii*, which it often accompanies on the islands and coastal regions of California. It bears some resemblance to the *Arbutus* in the red-brown of its smooth bark, and on its native shores it often acquires the gnarled and stunted forms common to the taller tree in its effort to resist the trade-winds. The oval or heart-shaped leaves, in their unusual thickness and leathery texture, suggest that they too are the results of exposure to those salt-laden winds. In its own country *A. Manzanita* will rise to twenty-five feet, and very attractive it is with its purplish terra-cotta stem and branches and the bluish-green of its leaves. The egg-shaped flowers are a rose-flushed white. They are borne during the later spring in two-inch panicles and persist for several weeks. *A. Manzanita* is not an easy shrub to establish. It should prosper in a free soil where *Rhododendrons* thrive, but I would always give it the fullest possible exposure to wind and sun, even where the climate is not the most genial.

As with autumn colour, ornamental fruits which remain long on the plants acquire a special value, and those which possess also attractive colour are obviously still more worthy in garden estimation. The *Pernettyas* of course excel in such respects, but *Gaultherias* run them close in lasting property and often exceed them in size and brilliance. Blue fruits, which seem to appeal to the human eye not less strongly than red ones do to the blackbird's taste, are not uncommon among shrubs, but in no other family that I can recall are they so generously provided as in *Gaultheria*. Soil and position, as well as the season, may have their influence upon this colour in *Gaultheria* fruits, but in *G. trichophylla*, *G. sinensis*, *G. tetramera*, *G. Veitchiana*, *G. Forrestii* and *G. Wardii*, they are usually of the purest blue, light or dark. In *G. tetramera* and *G. Veitchiana* they may lapse into violet and we have never had in *G. fragrantissima* the lovely opal-blue or clear indigo seen in this plant in some gardens. *G. trichophylla* is one of the most unchanging in the purity of its blue with us, as it is the

most prolific, yielding two abundant crops every season. But even this delightful little carpenter has a rival in *G. sinensis*, a compact mound, eighteen inches across, of semi-procumbent leafy shoots in a fresh green which are laden with fruits from early June to mid-August. These fruits, much like those of *trichophylla* in being pear-shaped, are very much larger, being nearly an inch long, and of a matchless blue, untarnished by the slightest hint of purple. This excellent species is said to present pink- as well as white-fruited forms, but these I have not seen. *G. Forrestii* has not yet produced any yield for us, though it is one of the most ornamental in flower, the white racemes contrasting vividly with the bright red wood.

A few *Vacciniums* also excel in garden merit where informal woodland conditions prevail, one of the best all-round species in our limited collection being *V. glauco-album*. An evergreen with a height and width averaging four or five feet, the grey-green comparatively large leaves have starch-white undersides. In spring three-inch racemes of cylindrical pink flowers accompanied by conspicuous rosy silvery-white bracts appear, and these are succeeded by berries the size of Currants. These berries, borne in great profusion, are plum-black but they have a coating of blue bloom which gleams with a strangely brilliant luminance throughout the autumn and often well into winter. This Himalayan is a shrub of much quality in a genus containing many species of little garden use. Even though apt to be injured by severe frost it is always worth a trial, and where it succeeds the semi-evergreen *V. padifolium*, the Madeiran Whortleberry, which grows much taller, will be found interesting. It is not so striking a shrub as the last-mentioned, but its red-flushed primrose-green bells, luxuriantly yielded, have their attraction and the half-inch fruits, black with a blue bloom, will not be passed unobserved against the dense foliage, often flushed with red in autumn. Though our largest bush of *V. glauco-album* and that charming evergreen *V. Mortinia* were badly injured by the zero frosts of 1939-41, this Madeiran, growing close by, was scarcely affected.

In deciduous *Vacciniums* some of the North Americans we find good value, more especially in their contributions to autumn colour, but there is one, *V. virgatum*, often sent out as *V. corymbosum*, which is estimable at all seasons. A loosely disposed shrub of four or five feet, it is pretty in late spring when carrying its crop of rosy bells. These are followed by blue-black berries and the two-inch leaves develop a range of autumn tints which includes wine-purple, orange, scarlet and blood-red, and this display may last at least a month. Even in the winter garden the red young twigs of this *Vaccinium* will not escape notice. The slenderly branched *V. pennsylvanicum* which, in its several forms, varies in height from eighteen inches to three feet, makes an attractive group, its silver-pink bells and deep purple fruits often being seen together during summer and autumn, and the foliage surrenders its bright green to a glowing red-bronze and crimson. But in this matter of leaf colour *V. corymbosum*, a graceful shrub of four feet, and its taller variety, *V. c. amoenum*, are still better, the leaves being a gorgeous crimson-scarlet for several weeks. Yet one more deciduous *Vaccinium* may be included in this brief selection and that is *V. stamineum*. A modest little shrub of about three feet, this North American—an old introduction—is perhaps more interesting than ornamental, for in the small white flowers the corolla opens flat, instead of being globose or cylindrical with a more or less contracted mouth. These blossoms with their projecting yellow anthers have a superficial

resemblance to those of some *Solanum* in miniature. Borne in ample two-inch racemes in late spring the flowers of *V. stamineum* are pretty in a dainty way and the two-inch ovate leaves often colour well in autumn.

Most of these North American *Vacciniums* are suckering plants, but we do not find them troublesome on that account, nor does it mean any loss of value in garden estimation, as is the case with *Pernettya mucronata*, which, in our experience, ceases to be fruitful once it takes to unrestrained suckering. Moreover, since these plants suggest grouping where autumn colour is a primary object, this moderate "running" may often prove a virtue rather than a fault.

THE AWARD OF GARDEN MERIT.—LXIX.

311. CARYOPTERIS × CLANDONENSIS.

Award of Garden Merit, April 13, 1942.

This floriferous hybrid shrub produces in late August and September numerous trusses of flowers in the axils of the leaves on the topmost six to twelve inches of the current year's shoots. The colour is commonly described as "blue," though it matches 38/2 of the Horticultural Colour Chart and should therefore be called Aster-violet. The individual flowers are smaller than those of the seed-parent *C. mongolica*, but larger, darker and more freely borne than those of the other, *C. Mastacanthus* (syn. *C. incana*). The lanceolate leaves are also mid-way between those of the parents, being lanceolate, with a few coarse teeth, dull green above and silvery-grey beneath. The flowers are very attractive to bees and are followed by a crop of seeds which germinate freely and, as one would expect, produce a varied progeny. Some seedlings have darker flowers, but such plants seem invariably to inherit with the deeper colour the less robust constitution of *C. mongolica*. There is, however, no need to raise seedlings, for cuttings of both soft and hard wood strike as readily as those of a willow. Indeed, they will throw out roots if merely stuck in a jar of water. The plant prefers a sunny situation, but is not particular about the soil and is seldom damaged by frost. It should be pruned annually just before growth commences in the spring, cutting back each shoot of the previous year's growth to about two pairs of eyes, very much as one does those of *Buddleia Davidii*. Treated in this way the shrub forms a compact bush and produces stronger shoots and larger trusses of flowers than if left unpruned.

Like many another first-class plant, *Caryopteris* × *clandonensis* occurred as a chance seedling in the garden of Mr. A. SIMMONDS, our Assistant Secretary, at Clandon, near Guildford. Wishing to raise some plants of *C. mongolica*, in 1930 he gathered and sowed some seed from a plant of that species which was growing next to a specimen of *C. Mastacanthus*. In 1932 the seedlings flowered, and about half of them were hybrids between the two species, varying slightly in colour. Meanwhile, a hybrid seedling had sprung up under the plant of *C. mongolica* (which it eventually smothered), and this self-sown plant was of a distinctly better colour than those which had been carefully pricked out and potted up. So the latter were destroyed and the self-sown plant selected for propagation. It received an Award of Merit when shown in 1933 and eight years later a First Class Certificate, having, in the interval, become one of the most popular and widely spread of newly introduced shrubs.

HERBACEOUS PHLOX.

By J. COUTTS, M.B.E., V.M.H.

THE present-day race of garden varieties includes two distinct sections, viz., early- and late-flowering Phloxes, the first, or so-called summer flowering varieties, being descended from *P. maculata*, generally known as *P. suffruticosa*, while the late-flowering varieties—late July, August and September—are descended from *P. paniculata*, commonly known as *P. decussata*. They are both native of N. America, the former being figured in the *Botanical Magazine*, t. 1344, as *P. glaberrima* var. *suffruticosa*, and in the *Botanical Register*, t. 68, as *P. carolina*. The latter, *P. paniculata*, is figured in the *Botanical Magazine*, t. 1880, as *P. acuminata*; other synonyms are *P. decussata*, *P. cordata* and *P. undulata*. The native habitat is given as Georgia and South Carolina. It was introduced by a Mr. LYON in 1812. The type of *P. paniculata* as figured in the *Botanical Magazine* has small purplish flowers and, so far as I know, is not now in cultivation, although until fairly recently a small scrap was in the herbaceous collection at the Royal Botanic Gardens, Kew. There is, however, a white-flowered variety in cultivation at Kew, a very vigorous growing plant which, with good cultivation, attains a height of 5 to 6 feet and in my experience is never sick or sorry; in this respect it is very significant that many of the white-flowered garden varieties are more vigorous and less subject to the attacks of stem eel-worm than the coloured forms.

This white-flowered variety is a very charming plant with small white, starry-shaped flowers which, with age, are tinted rosy-purple; it is a fine subject for a large lawn bed or for grouping in the herbaceous border. Strangely enough, it seems to have been overlooked by our hardy plantsmen, for I have never seen it outside Kew. If some of the bright colours of the garden race could be transmitted to it, it would be a real acquisition, provided always that its distinctive small flowers and vigorous habits were retained.

P. maculata, the progenitor of the early or summer flowering section, has not been in cultivation for many years, at least I have never seen it until a few years ago when it was raised by Mr. T. HAY, late Superintendent, Hyde Park, from seed received from N. America. This species is a very handsome plant with a large, handsome inflorescence of rosy-purple flowers, the stem maculated, with dark green glossy foliage.

This section is not so tall as the later flowering *P. paniculata* varieties, neither does it include the brilliant colours of that group, although there is a considerable variety, ranging from white, through varying shades of rose-purple and lilac, many of them with a distinct dark eye. In a quiet way they have a distinct charm of their own and, if interplanted with the late-flowering varieties, they prolong the flowering season. For some reason they have never been commonly grown except in Scotland and the north of England.

In addition to the foregoing species, there are quite a number figured as species in Sweet's *British Flower Garden*, such as *P. cordata*, *P. corymbosa*, *P. glaberrima*, *P. maculata* var. *pyramidalis*, *P. odorata*, *P. penduliflora*, *P. scabra*, *P. speciosa* and *P. suavis*, etc. To-day they are all referred to *P. paniculata* and *P. maculata*; the colours range from white, rose, through varying shades of purple, rosy-purple

and purplish-lilac ; thus, so far as our knowledge goes, we may regard these early introductions as the progenitors of the present-day garden race.

I have consulted the last edition of BAILEY's *Cyclopaedia of Gardening* and his *Hortus Second*, 1941, and in both these publications he does not throw any more light on the origin of the garden race. If the two species were crossed in the earlier days, there is little or no evidence of it to-day, although some of the soft rose and lilac shades in the *P. paniculata* section may be derived from *P. maculata*.

The late-flowering varieties of Phlox have long been favourites, both in cottage and in more pretentious gardens ; this is not surprising when we consider their ease of cultivation and the great variety of colour, ranging as it does from warm and cold whites, through varying shades of rose, pink, salmon, red and orange-scarlet to amaranth, with a variety of shades in lilac, purple and bluish-purple, and not the least of their attractions is their delicious fragrance.

Although so generally grown, one too seldom sees them really well cultivated ; too often they are represented in both large and small gardens by large, starved clumps that have not been divided for years, or struggling for existence in shrub and herbaceous borders. In such situations they should be planted in generous groups, with plenty of space, in open situations. They are, however, really seen at their best when planted in borders by themselves, or in large lawn beds in open positions.

Cultivation.—They are not exacting in their requirements as they succeed in almost any good garden soil that is deeply cultivated. They are, however, gross feeders and enjoy any amount of well decayed farmyard manure, with liberal dressings of fine bone meal. Where farmyard manure is unobtainable, spent hops or decayed leaf soil is an excellent substitute. Although they do well in the open, in the south at least, they seem to enjoy a position where they get partial shade during the hottest part of the day.

To have them at their best, they should be divided and replanted every third year. Where there is an existing collection, this is an excellent method, as one can plant good clumps and thus be assured of a good display the first season, whether the transplanting be done in early autumn or spring when they are commencing to grow. On the whole autumn planting is to be preferred unless the situation is on heavy, cold soil as, with autumn planting, they have a good chance to get well established for the following summer. Some growers condemn this method as there is a risk of transmitting disease, but what disease they do not say. In my experience, there is no disease that attacks them, but there is, of course, the danger of transmitting eel-worm.

Some varieties divide fairly easily, others in a few years make a hard woody rootstock that requires a very strong knife or a small chopper to dismember it. In any case, so far as is possible, the young outer portions should be selected for replanting.

One important point in their successful cultivation is the fact that they must be planted deep, the crown can be covered with at least 4 inches of soil. Indeed, this also applies to many other strong growing herbaceous plants.

If the clumps are overcrowded with shoots, these should, when 3 or 4 inches long, be thinned out and, if so desired, can be used as cuttings, inserting them in sandy soil in a cold frame.

During the summer, they enjoy a mulch of well-decayed manure or leaves, and during hot dry spells should be given copious waterings at the root. The stems are very brittle and most writers stress the importance of staking them in time ; provided they are well grown and given plenty of room, 18 inches to 2½ feet according to variety, I have seldom found it necessary to stake them, but here one must be guided by experience as some varieties are weaker in the stem than others.

Propagation.—As already indicated, Phlox are easily increased by means of the young shoots when they are about 4 inches long, care being taken to select them from healthy plants, free from stem eel-worm.

They are also readily increased by means of root cuttings. The roots should be cut into pieces about an inch long and sown in boxes of sandy soil, covering them with about an inch of soil. The boxes can be stood in a cool greenhouse or cold frame.

They can also be raised from seed, and it is surprising that this method is not more generally practised, for it ensures healthy plants, also there is the added interest of the possibility of getting improved varieties.

The seed should be collected and sown in boxes of sandy soil as soon as it is ripe, not kept until the spring as is usually advised, and the seed boxes stood in a cool greenhouse or cold frame. Germination is somewhat slow and uneven, but by spring most of the seed will have germinated, and when the young plants are a few inches high and have been hardened off they should be planted out in nursery beds. This also applies to stock raised from cuttings. By sowing the seed when ripe, the resulting plants should all flower the first season, thus one is able to select the best and discard inferior varieties.

Pests and Diseases.—In my experience, Phlox is not subject to any disease and the only pest, and it is a serious one on some soils, is stem eel-worm, which attacks the stem just at and above ground level. It is easily detected by the swollen and puffy appearance of the stem ; sometimes a whole clump may be affected, in other cases only a few shoots. Sometimes the young shoots may make only a few inches of distorted growth, in other cases they may attain flowering size before they collapse and break off at the base. As there is no cure for it, all affected plants should be promptly grubbed out and burnt.

A dressing of lime is said to be a preventative and it may be that an acid soil favours this pest. It is also important to give them a move on to a fresh site every few years, and here it is important that healthy stock only should be used when moving them to fresh quarters. It may also be wise to discard such varieties as are subject to attacks from this pest, and in this respect they vary considerably. In my experience, some of the orange-scarlet varieties are very susceptible, while many of the white and white-tinted varieties are more or less immune, this no doubt being due to some difference in the cell sap. I am not aware that this has been investigated.

On some soils slugs prove troublesome and must be dealt with, by trapping and poison baits.

ALPINES AT WISLEY.

By JOHN T. WALL, Superintendent, Alpines Dept., Wisley.

As a change from the prevailing notes and discussions on the economic side of Horticulture, a few words on the subject of Alpines and rock plants at Wisley might prove a welcome change, especially to those Fellows unable to enjoy a visit to their gardens this year.

Alpines and rock plants have this current year enjoyed a successful season; the hard winter with heavy falls of snow seemingly suited them very well. *Glaucidium palmatum* was rather an exception, as only two or three of its lovely mauve flowers developed. *Ranzania japonica*, which was also subjected to the rigorous winter conditions, was never better and numerous deep mauve pendent flowers were followed by glistening white berries.

The collection of Crocus species from the John Innes Institute provided a precocious display in long succession, forming ribbons of colour in the February sunshine. Miniature Daffodils are a special feature of these Gardens and were more prolific than ever, though somewhat late owing to the dry weather that prevailed at their usual flowering time. Some very interesting spontaneous hybrids between *Narcissus cyclamineus* and *triandrus*, and the former with *N. Bulbocodium*, flowered on the Alpine Meadow this season.

Early flowering dwarf Rhododendrons in the precincts of the Rock Garden had a lengthy flowering season without frost damage; especially noteworthy were *R. Cilpinense*, *ciliatum*, *praecox* and *Williamsianum* × *orbiculare*; this latter gave a magnificent display of its large rosy pink bells.

In the Alpine house the usual display has been well maintained. Of special note was the well-flowered pan of *Cassiope lycopodioides* and *Cassiope* sp. Sh. 2; this latter resembles *C. fastigiata* in habit, but differs in several minor respects. *Ourisia microphylla* (Fig. 121) from COOMBER'S Andes expedition still survives at Wisley; this year it surpassed all previous efforts, forming trailing, lycopod-like growths that terminated in almost stemless pink, white-throated flowers. This year I tried it in a pan without drainage, one-half filled with unbroken turf loam and the remainder scree mixture. The result has been most satisfactory in producing a good specimen of this difficult plant.

Daphne jasminea, with greenish-yellow tube to pinky buds, produces its second flower crop in August; a tidy little shrub of stubby branches and small glaucous-grey foliage, its neat habit and slow growth make it ideal for the Alpine house. Few of the Pelargoniums are really hardy enough for the Alpine house; *P. Endlicherianum*, a Syrian species, usually survives and makes a brilliant display of large rosy-purple flowers—a most bizarre effect is provided by the three lower rudimentary petals.

Campanulas are a great asset for late display and the number of species, hybrids and forms are legion. Few of them are bad and many are excellent showy plants. The best in the house this year have been *C. incurva*, with large pale blue Canterbury bells on stiff incurved branches, *C. arvatica alba*, the neat little double-flowered *C. warleyensis* and its brilliantly blowsy counterpart in *C. × hay-lodensis* (see Fig. 122); all are of easy cultivation.

The two now well-known forms of *Weldenia candida* have been good. The narrow glabrous leaved form is easily propagated from stem cuttings. The main care is to see that the potted plants are not discarded as dead in the winter when the foliage and stem dies away, a sad fate that overtook the first batch I ever rooted.

Primulas of the 'Petiolaris' section, in the form of *P. aureata* with golden yellow-flowers, fading to pale yellow in the throat and white mealy crinkled foliage, and *P. bhutanica* with similar foliage and powdered pale blue flowers, flowered at Wisley for the first time. On the Rock Garden fresh sites have been prepared in which *P. sonchifolia* and *Edgworthii* (*Winteri*) are showing excellent promise. *Acantholimon Giseliae* is not such a brilliant plant as it was heralded to be ; it is, however, very pleasing and has a distinct inflorescence, and the flowers are really quite good in size and colour.

What I believe to be the first flowering of an albino *Erinacea pungens* occurred at Wisley in the early summer. The flowers are a good solid white, not at all "thin and watery" as was feared. Mrs. LUKIN found this plant in Spain some years ago and brought cuttings to Wisley, bringing them the whole journey exposed to the air, so we were indeed fortunate to get two of the pieces to root ; it should prove quite an acquisition when well flowered.

Adonis brevistylis (G.S. 1600) commences to produce blue-backed white flowers and ferny foliage when only 2 or 3 inches high, and continues to do so throughout the summer, gradually attaining to some 15 inches. At Wisley it thrives and decorates gracefully a small pocket on path level facing north.

The Skull-caps are of great merit for late summer flowering ; some thrive on aggression. *Scutellaria baicalensis*, some 18 inches high, will, with its long secund inflorescence of violet-purple flowers and white bar on the lower limb, thrive in any well-drained sunny spot and never encroach. The pale blue form of this, *S. baicalensis coelestina*, is perhaps more attractive, but not hardy—it is invariably short-lived at Wisley. Smaller in stature and of lowly mien is *Scutellaria scordiifolia*, which was presented to the Gardens by Mr. MARK FENWICK last year. Never more than 6 inches high, the thin wiry stems support well-displayed, rich blue flowers of inordinate size. Introduced to gardens from Siberia in 1817 it is seldom met with ; there is a most delightful plate in *Lodd. Bot. Cab.* of this most attractive plant.

Asclepias pumila has proved this season that it can have considerable merit as a scree plant, where it forms neat clumps, 4 to 6 inches high, terminating in neat pink buds that open creamy-pink ; not the least attraction is the glossy linear green foliage that exudes the usual milky juice—typical of this genus—when crushed.

A hybrid *Roscoea* spontaneously produced at Wisley is *R. purpurea pallida* × *R. alpina*. It is intermediate in height and season of flowering. The flowers, almost as large as those of the seed parent, are of a deep rosy-purple colour ; it should prove a welcome addition to this limited genus.

There is scarcely any excuse for wishing to add yet another hybrid to the many already existing in the genus *Campanula*. So in some trepidation I record a direct cross between *C. cochlearifolia* (*pumila*) and *C. mollis*. The result has some distinction, but time alone will acclaim or damn its hopes of longevity. While on this subject of "home produced" new plants, mention should be made of an albino *Cyananthus*, obtained from *Cyananthus lobatus* Cooper's var. It

was while visiting the late R. H. MACAULAY's garden in Scotland that I gathered (by permission) seed of this species, and raised and flowered them at Wisley. One of the seedlings flowered "blotchy," a bud was "bagged" and the flower "selfed," two seedlings came near white, and the same performance was repeated, which curiously enough brought forth all "purple" flowered forms, except one which is a pure solid white that does not fade to even a suspicion of blue. It is my first knowledge of a pure white *C. lobatus*, but recently Mr. D. WILKIE informed me that both KINGDON WARD's and SHERRIFF's seeds of this species have produced "almost white" forms.*

This is the peak season for Gentians, and Wisley is famed for its wealth of *G. asclepiadea*. Not all rock gardens can support the 2- or 3-foot sprays of the Willow Gentian which naturalizes itself so prolifically over these gardens. Of the newer members of this genus SHERRIFF's *G. ornata* (2882A) is outstanding, with large pale blue trumpets and bright green robust foliage; it proves more amenable than the type. *Gentiana Veitchiorum* is also making a better show, and the hybrid *G.* × 'Devonhall' of Mr. HARLEY's raising is still the showiest of the *ornata* group. A charming hybrid too is *G.* × 'David,' from R. H. MACAULAY's garden, offspring of *G. prolata* × *ornata*; there is a distinct "illumination" about the moderate sized erect blue trumpets. I can see no difference between this plant and *G. Shawii*, received from Edinburgh Botanic Garden this year.

Gentiana Makinoi from Japan appears to hybridize freely, and what appear to be *G. Makinoi* × *lagodechiana* and also × *Pneumonanthe* hybrids are flowering this year. The New Zealand *G. saxosa* with its prostrate black stems and shining green leaves studded over with pure white flowers makes a good show on the Rock Garden, and in a pan it can certainly stand much more sun and drought than most of the other species.

These notes would not be complete without mention of two other plants for late display, firstly *Scabiosa graminifolia*, with its long silver-grey leaves and bluey-mauve flowers that continue well into October, and secondly the well-known Californian Fuchsia *Zauschneria californica* in its various forms; nothing is so cheery in the sunny autumn days as these orange-scarlet trumpets and ruddy tinted foliage. Its cultivation is too well known and easy to need any hints from me.

Particular attention is being paid to propagation and stocks are kept up to a maximum, as it behoves all who can to do their utmost in this way. It is not a difficult matter to work a little sand into the soil of your garden, firm it, and make a small skeleton frame with a few pieces of wood and a piece or two of glass; there a few cuttings of all plants that "fail" with you, cleaned up and cut close to a node, should be inserted firmly. Alpine plants are already scarce in the trade owing to the demands of food production and depleted stocks. After the war trade firms will be searching for material to build up their vanished stocks, and all who can assist them in any way will be doing a great service to horticulture.

* Since these notes were written I have learnt that this plant has occurred in the gardens of Lord ABERCONWAY and Mr. T. HAY, from SHERRIFF's seeds.

THE CARE OF CUT FLOWERS.

By M. A. H. TINCKER, M.A., D.Sc., F.L.S.

(Keeper of the Laboratory, Wisley.)

AT the present time when our scale of relative values may be subjected to rude revision, appreciation of natural beauty is quickened and enhanced. To-day the brightness of cut flowers stands out in more sharply defined contrast with the somewhat sombre background of our daily affairs. A curtailment in the supply of flowers has taken place, the demand for increased food production having resulted in the appropriation of fields and greenhouses used for decorative plants. In view of the economy so many must now practise it is not an inopportune time to consider ways and means of making the most of available materials.

The commercial production of flowers is described in the three bulletins prepared by TAYLOR and JOHNSTONE (64, 65, 66) * dealing with many spring and summer flowers and with plants of decorative foliage. Some details of the technique of cutting, preparing for transport, packing and transporting flowers for market are given. The production of flowers for cutting from a reserve in a private garden and the material available throughout the year has been described by Jekyll (34), whose lists of flowers suitable for cutting and those which have proved unsatisfactory are given as an appendix.*

Methods of cultivation employed by flower growers influence the lasting quality of their products. STEVENS (60) remarks: "There are some expert growers whose technique is such that the substance in the flowers they produce seems to be three times as much as that in the same variety grown by other people. It is not the number of flowers cropped from one plant that is most remunerative in the long run, but the number of hours the flowers will last when cut off the plant, and this usually means fewer flowers per plant." These points are closely related to the condition in which flowers reach the buyer.

Points concerned with Cultivation.—Only brief mention can here be made of some factors of the environment of the plants known to influence the duration and other qualities of cut flowers. Under greenhouse conditions the following tend to curtail the life of cut flowers: too high temperatures or excessive forcing; over-watering and under-watering; inadequate shading of certain flowers; for example, Roses in America require partial shading in summer, and LAURIE and LINK (42) find that when grown under cloth the flowers last better. Grown in open ground periods of drought frequently shorten the duration of the flowers of many plants, hastening on their maturation and seed production; drought may also cause a limited expansion of the petals. The relative wetness of the soil as it influences the concentration of soil nutrients has been shown by NIGHTINGALE and FARNHAM (50), and by SMITH (58), to influence the fall of the flower buds in Sweet Peas. In winter with high dilutions and free

* Considerations of space have rendered it necessary to cut out a number of experiments reported by Dr. TINCKER and also to omit the very valuable bibliography he had prepared and the lists of species. A complete copy of the paper and of the bibliography, to which the references by name and number have been retained in the printed text, has been deposited in the Lindley Library and may be consulted by readers who desire to obtain further information.

uptake of nitrogenous solutes the useful life of the flowers is nil; by withholding moisture and so increasing the concentration of the soil solution the nitrogen uptake is kept low and the flowers do not fall. This is an extreme case of environmental control of the life of the flowers.

The level of soil fertility, in pot or plot, also plays an important part; in extreme cases, "starved" plants bear poorly developed flowers which shed their petals early; excessive manuring, especially with nitrogenous fertilizers, may lead to large but soft growths readily damaged. Adequate potash and phosphorus are, of course, necessary.

The flower stems of Tulips, grown for the early cut flower trade under conditions of high temperature, and perhaps high humidity also, may lose their turgidity and become so soft that they fall or topple over. This condition, named "topple," or "wet stem," occurs sometimes in purchased cut Tulips. Whilst varieties show various degrees of susceptibility, the previous treatment which the bulbs have received largely influences the incidence of this trouble. Dutch investigators think that factors likely to interfere with the process of normal flower development from the earliest stages of the bud may predispose the plants to "topple." Methods of cultivation, including time of lifting, conditions of storage, including duration and temperature, and times of planting for forcing, all may play a part according to PINKHOFF (53). BEIJER and VAN SLOGTEREN (17) consider that the initial but brief cool temperature storage (17° C.), favourable for subsequent early forcing, may be one such predetermining factor. Bulbs so influenced frequently show these ill effects at a later stage, especially if the forcing conditions are too drastic. At Lisse a cure was found in 1931; ULYDERT (68) studied the influence of certain nutrient chemicals upon cut flowers—sugar, without salts, favoured the development of topple, but calcium salts, especially the nitrate, when used in weak solutions, largely prevented it. Into a weak solution of calcium nitrate the cut flowers may be placed before dispatch for 12–24 hours, or overnight; the solution can also profitably be applied on one or two occasions to the growing plants during the later stages of forcing, but an excess of calcium nitrate is to be avoided as the effect is negative (see Anon. (7)).

Principles involved with Cut Flowers.—A high proportion, perhaps 75–90 per cent., according to species, or variety, of the fresh weight of cut flowers is water. The water present in the tissues represents the balance between that taken in and that given out to the atmosphere through leaves, petals, and to a less extent by the stems. Temporary wilting occurs when the rate of loss of water is so great that the turgidity of the tissues can no longer be maintained. If the subsequent rate of uptake of water can make up this deficit recovery occurs. There is a point in the drying process from which recovery is no longer possible and permanent wilting takes place.

The water passes up through the wood vessels of the stems to leaves and flowers. Adjacent to these vessels are other cells, cut when the stem is severed, whose contents then escape into the water of the vase or container. At the base of cut stems sugars and mineral salts are thus available for ubiquitous bacteria which rapidly multiply. They may be accompanied by saprophytic fungi and simple unicellular forms of animal life. Bacterial development, and especially the production of slime-like and sticky substances, frequently leads to a great decrease in the open diameter of the wood vessels which retards the rate at which water enters. Methods of preventing this

clogging of the tubes include the addition to the water of chemicals that retard bacterial and fungal growth, the removal of the choked ends of the vessels by cutting, preferably under water, thus producing a new clean surface again, and heating the tissues with hot water, which kills many bacteria (but also kills the tissues of the plants at their base, thus encouraging bacteria again). The repeated changing of the water tends to prevent high concentrations of the bacteria, as does also the removal of any leaves likely to be submerged in the water and whose slow decay enriches the water for bacteria and fungi.

In our rooms and offices high temperatures permit the atmosphere to hold more moisture; this causes a greater deficit of the air from saturation by moisture which favours the loss of water by the leaves and petals. There are minute pores, or stomata, in large numbers on the underside of most leaves, which open or close, regulating the rate at which water vapour passes out. At night, in the dark, the stomata normally close and check the rate of water loss, but their daily rhythm may be partially upset by artificial illumination. Although of little practical value, it has been shown that flowers last longer in the dark (GRUNING (29)) or in a shaded position. Some loss of water also takes place directly through the leaf surfaces and limited transpiration continues by night.

The growth or development that may take place in cut flowers is generally limited to the expansion of buds previously initiated and to stem elongation which are brought about by the elongation of cells stretched by the uptake of water; for both these phases of floral growth adequate supplies of water must reach the upper buds.

The function of coloured petals is primarily one of attraction of insects to ensure pollination and subsequent fertilization. After pollination the petals of many flowers may quickly fall. In order to keep the flowers in bloom one should cut young material before the buds open, and select flowers whose anthers have not burst and from which pollen is not available for insect or other transmission. Protogynous flowers, whose stigmas mature first, should also be cut early.

The tissues of cut flowers are, like other living plant material, subject to poisoning by minute traces of gaseous atmospheric impurities, such as the small concentrations that arise from coal gas burners, and from domestic fires. The influence of minute traces of ethylene in accelerating processes of maturation and ripening of fruits and other tissues has been definitely established. Ethylene may shorten the life of cut flowers, and traces of this gas occur in rooms where coal gas is burned.

The most important point is the effect of temperature upon the rate of water lost by the plant.

Cutting and Preparing.—Stems cut in the early morning contain more water than do those cut after hours of hot sunshine, which may also partially bleach the expanded petals. Many writers, including BASTIN (12, 13) and SUDELL (61), advocate the cutting of flowers such as Sweet Peas before the dew has evaporated. Some writers prefer to cut in the late evening, especially Roses, so that the buds may open in the shade indoors. These recommendations are made to obtain fresh turgid material (see LAURIE (38)). Similar practices have long been followed in the cut flower trade with Carnations (see TAYLOR (62)), with Tulips (see SOUTHWELL (59)) and with other flowers. GRUNING (29) did not find the time of cutting important in the large scale tests made with many plants. To ensure the uptake of adequate supplies of water, B. D. S. (15), BROTHERSTON (18), GRUNING (29), JEKYLL (34),

PETTS (52), recommend that shrubs—Azaleas, Currants, Guelder Roses, Hawthorns, Lilac and Roses—be cut with a long sloping cut to expose more surface of wood to the water and to prevent the sealing of the wood vessels that might arise from a flat-cut end resting on the glass of the vase. Other methods are to split the stem for several inches by a deep cut, or to scrape away the bark and the tissues external to the wood at the base of the stem. In the case of woody Chrysanthemums it has been stated that crushing the stem at the base into fibres permits more water to enter, but it also encourages bacterial and fungal growths; and, as LAURIE states, "A clean cut results in less bacterial action than does snapping or breaking the stem; this tends to increase longevity." There is, however, some evidence that breaking the stems of Chrysanthemums is a suitable treatment for these plants and may be preferable to cutting (DORNER (21)). Amongst other plants that have given better results when the stems are split are Lenten Roses—*Helleborus orientalis* (see JEKYLL (34)), Gaillardias, perennial Sunflowers and herbaceous Phlox (PETTS (52)), but LAURIE recommends this also for Azaleas, Chrysanthemums and Lilac. It is stated by GRUNING (29) and others that crushing the base of the flower stem of Cyclamen increases their duration in water.

On cutting the stems of Campanulas, Poppies and some other plants latex exudes which, on solidifying, chokes the wood vessels and prevents the uptake of much water. JEKYLL (34), PETTS (52) and others advise that stems of Campanulas, Convolvulus, Poppies, Stephanotis, etc., be split to aid the dispersion of the latex and to present a larger surface for water uptake. Other recommendations are based on the closing of the cut lactiferous tubes by heat; BASTIN (13) and GILL (27) state that Shirley Poppies last longer if the basal ends are first immersed in hot water. Others prefer to char the ends of the stems with a flame (KOEHN (36)), and some report success with Euphorbia and Poinsettia. Although they have no latex, Dahlias respond favourably to such treatment, and LAURIE (40) also lists Mignonette and Heliotrope as flowers that respond to a short period of hot water treatment of the stalks, provided no steam reaches the flowers. GILL (27) states that such heating does not give a lasting effect; the latex may accumulate again. As the uptake of water by the wood is primarily a mechanical process, the death of the surrounding tissues is not an immediately serious disadvantage but results in bacterial action. From the stems of some plants, such as *Sphaeralcea umbellata*, mucilage quickly exudes on cutting. This chokes the wood vessels of the stem and water is not readily taken up and the leaves and flowers wilt. A slower exudation takes place from the stems of other Malvaceous plants.

By cutting Gladioli and exposing the inflorescence spikes to sunshine for about twenty minutes loss of water occurs, but the subsequent lasting quality of spikes so "softened" is prolonged. American investigators have shown that the development of the flowers is checked by a small reduction of the moisture in the tissues, and that the effect of such treatment persists. Similarly the life of Gladioli cut when the plant contains less moisture, at 2 P.M., is prolonged. PRIDHAM and THOMPSON (54) estimated the number of florets opened during transit, and found that more opened when the moisture content of the tissues was high. The softening practice is explained by scientific observation as a means of checking development by withdrawing moisture; but the difference between the lasting properties of Gladiolus varieties is larger than that caused by softening. Here is an exception

to the rule, for the general advice is to cut plants when they contain abundant moisture. GRUNING (29) shows that Dahlias and Cosmos do not suffer from a period of several hours drying before being placed in water, the check to transpiration persists, and in other cases an interval (3-4 hours) before placing in water was not disadvantageous but frequently advantageous. Many small annuals last longer in water if the entire plant is taken from the ground and the roots left to perform part of the water absorption—a method proved useful with Clarkia, Godetia, Heliophila, Nemesia and other small annuals.

The reduction of the leaf surface by removal of leaves unnecessary for decoration reduces transpiration; this prolongs the life of many cut flowers, but GRUNING (29) found Chrysanthemums and *Viola tricolor* to be notable exceptions. The removal of basal leaves of Chrysanthemums and other plants would seem to be a sound practice based on the principle that such tissues when immersed in the water slowly decay and always encourage bacterial development. Repeated cutting of the stems tends to check bacterial development and was found advantageous by GRUNING (29) in about 33 per cent. of the tests made, and is recommended with precious flowers if a slime readily exudes from the cut ends.

Cutting under Water.—In the stems are wood vessels, tubes of narrow diameter, through which water passes upwards, but bubbles in these may impede the flow; by cutting the stems under water air bubbles can be avoided. Although many have commended this practice as an aid to keeping flowers fresh—GARNETT (25), DORNER (21), KOEHN (36), SUDELL (61)—the number of carefully conducted tests is small. In American experiments (40) the effect of cutting under water varied with the plants tested; with annual Chrysanthemums, Asters, Boston yellow Daisies, Carnations, Marigolds, Snapdragons and Sweet Peas some advantage accrued, but with Calendulas and Stocks no difference was noted. In GRUNING's tests (29) in only seven out of thirteen cases did flowers cut under water last longer, and the trouble involved was not justified.

Preliminary Saturation.—There are a number of agreed points of practical importance based on the principles outlined. At the beginning of the period of use the stems and other tissues of cut flowers, from shop or garden, should be "saturated" with water. This is brought about by placing the flowers in water in a deep vessel, the stalks immersed "up to the necks" of the flowers, and standing in a dark, cool room for 12 or 24 hours. All the conditions are against loss of water, and the tissues take up the maximum amount. There are other methods of bringing about this condition: flowers are cut and their stalks placed in 2 inches of clean wet sand; they are then covered by a bell glass for several days—the atmosphere inside is humid and becomes saturated with moisture (BASTIN (14)). Less effective covers, such as paper bags, have been used for creating a saturated atmosphere around the freshly cut flowers (B. (11)). The use of tepid water, especially for foliage, has been advocated during the "saturation" period. GRUNING (29) states that hot water checks the rate of water loss from the tissues and prolongs the life of Dahlias, Chrysanthemums, Sunflowers (*H. uniflorus*) and Antirrhinums.

This preliminary saturation is almost a necessity for the opening of the buds of plants such as *Iris unguicularis* (*alba* and other varieties); it has been generally advocated by AUTON (10), B.D.S. (15), KOEHN (36), STEVENS (60) and many others.

Commercial Preliminary Saturation.—In 1909 WAUGH (70) wrote that Narcissi grown for cut flowers were picked from the open ground when in bud and given the protection of gently heated sheds or glass-houses in which to open, in order to reach the market clean and undamaged by keen winds. The uptake of water during this period ensured turgidity and mature flowers were kept for several hours, or more often overnight in water, before packing. Later, DALLIMORE (19) and WOLF and WALBANK (77) remarked on a similar technique used with other varieties. Carnations (see TAYLOR (62)) cut before full maturity are generally placed in deep cleaned containers full of water before they are graded and packed, thus enjoying a period of uptake of water in cool packing sheds before despatch. SOUTHWELL (59), referring to Tulips, mentioned cutting during the early morning or at dusk to ensure a high water content in the tissues; cut Tulips remain for several hours, or overnight in water before despatch (WALLACE and HORTON (72)). Wooden boxes may be soaked in water to prevent the drying of the flowers during transit. The relative merits of non-returnable cardboard and returnable wooden boxes must be considered from this point. Non-absorbent cardboard boxes can be made, and waxed paper lining has been proved of value on long American journeys.

Describing the production of Anemones for cut blooms in S. France, MANNING and GREGORY (45) state that a 12-hour period in water often occurs before grading and packing and transit. Violets are picked when fully open; they do not develop satisfactorily when cut in the earlier bud stage (JOHNSTONE (35)).

Purchasers may not realize the care taken with cut flowers before despatch. The treatment to which the flowers are subjected depends *inter alia* on the variety; for example, ABBISS (1) states that Narcissi 'Sir Watkin' and 'Hospodar' need many hours in water to develop their colour; other varieties of *Barrii* require dull light so that the colours are not bleached; 'Soleil d'Or' benefits by strong light. In addition to the development that takes place whilst the flowers are in water, growth by stem elongation of Irises and Tulips takes place during transit and is allowed for when packing.

Many readers will have seen *Acacia dealbata* offered for sale as 'Mimosa'; formerly this was imported from S. France, where the shoots of the plants are cut and placed in water in dark, warmed sheds and subjected to warm steam at 77° F.—87° F. for 12 hours or more, according to the season. This treatment causes the dormant flower buds formed in summer to open in November several months before their natural season of flowering. The process was described by VILMORIN (69) in 1893 and more recently in the *Gardeners' Chronicle* (8).

Contrasting with American conditions there are few British markets that cannot in peace time be reached by rail or road in less than 24 hours from the growing locality. On the Continent, for the trade from S. France, special insulated vans were used—cold in summer and warmed in winter. Cooling by means of "drikold" or solid CO₂ affords a ready means of obtaining low temperature; in 1936 flowers were reported to arrive in fresher condition when sent in vans so cooled. The practice of placing small quantities of "drikold" in the boxes might prove dangerous unless carefully regulated, for flowers require adequate air and oxygen and will not tolerate for long high concentrations of carbon dioxide. GIBSON (26) discussing cardboard boxes remarks that deep lids, closely sealing the box, prevent aeration and cause the accumulation of high concentrations of carbon dioxide, causing soft blooms of Narcissus to have a short life.

Temperature and Moisture Conditions of Storage.—The duration and intensity of the cold period of storage and transit influences the lasting qualities of the flowers when transferred to room temperature.

DORNER (21) states that precooling has proved ineffective to prolong the period of usefulness of cut flowers after release from a lower temperature. WHITEMAN and WRIGHT (76) have tested the subsequent behaviour of the Wedgewood Iris on removal from cool storage. Freshly cut buds lasted, in water, for four days at 70° F., or if cut at maturity for only three days, but after one week's dry cold storage at 32° or 40° the keeping quality was reduced to one day at 70° F. Cut at maturity and held at 32° for one week or longer as during transit, the blooms only lasted one day at 70° F. These tests show the fallacy of attempting to hold buds of this variety of Dutch Iris in water at a temperature much higher than 32° F. for longer than one week, "with a view to subsequent use at higher room temperatures 70° F." At 60° F., a temperature at which many of our rooms are maintained, the Irises would last longer; the sudden transference from cold storage (32° F.) to American centrally heated rooms (70° F.) is highly unnatural. The authors suggest that at ordinary refrigerator temperatures customarily maintained by florists similar buds could probably not be held for longer than two or three days and still be saleable as choice cut flowers.

Some few years ago WHITEMAN, WRIGHT and GRIFFITHS (75) tested the storage of cut Tulips and found varieties to differ in their keeping qualities; at 32° F. the flowers lasted for a little over a month, but by a week's cold storage their subsequent duration in good condition was greatly reduced. Storage in cool rooms (40°–50° F.) was not satisfactory. The use of wax-lined boxes during transit tended to prolong the subsequent usefulness of the flowers. A preliminary period of 15 hours in water was useful for improving the appearance of flowers for immediate decoration, but it did not improve their performance in the cold storage.

THORNTON (67) used Roses to test the influence of controlled temperature, moisture and the concentration of carbon dioxide on the duration of flowers. The carbon dioxide concentrations were obtained by the volatilization of solid carbon dioxide ("dry ice" or "drikold"). At temperatures of 38° and 50° F. for three to seven days the life of Roses such as 'Briarcliff,' 'Mrs. F. R. Pierson' and 'Talisman' was prolonged. Storage in this gas mixture beyond a week proved valueless as, although the opening of the buds was delayed, on subsequent release from the gas-stores a rapid fall of the petals took place. High concentrations of the gas quickly caused injury. Other flowers, including Carnations, Dahlias, Gladiolus, Snapdragons and Sweet Peas, were also stored in various concentrations and some delay in bud opening resulted, but no material gain was derived with open flowers. Sweet Peas showed few harmful effects and certain Carnations derived some benefit by 5–11 per cent. carbon dioxide. The increase in the period of satisfactory storage was some three to seven days at 38° to 50° F. with Roses in bud, but no marked increase in the life of the flowers resulted.

LONGLEY (44) tested the influence of various gases in cold stores maintained at 33°–34° F. on Roses and Carnations and concluded that storage for two weeks "seemed about as long as would be worth while," although Carnations kept well for three weeks with traces of sulphuretted hydrogen in the air. Additional carbon dioxide, 8 per cent., retarded the opening of the Rose buds and caused a lighter colour of

the petals but did not materially prolong their life. Although sulphuretted hydrogen gave results of some promise, in no case did LONGLEY report valuable prolongation of the life of the flowers by the addition of gases to the cool air during storage, nor by the use of sugar solutions in which the stems were placed.

With French Marigolds a temperature of 40° F. was found by NEFF and LOOMIS (48) preferable for storage to 33° F. After two or three weeks' storage, the flowers lasted better if they had only been packed in waxed paper, than if allowed water, or permitted to dry more by packing in brown paper. A small loss of water acted as a check on maturation with this plant as it does with *Gladiolus*.

NEFF (49) has now extended his experimental observations on storage conditions to Carnations. In carefully conducted tests he found 33° F. a better storage temperature than 40° F.. After periods of 37 days, flowers stored in "dry pack" closed containers lasted much longer at room temperature, some 70-80 hours, than flowers stored with the stems in water, which lasted only 42 hours. The "dry pack" flowers compared favourably in lasting quality with freshly cut flowers placed alongside. Carnations which had wilted a little previously to "dry packing" were superior to those packed in a turgid condition. When removed from "dry pack" storage and placed in water at room temperature uptake of water took place for 46 hours, but flowers from "water storage" lost weight. In the closed containers the oxygen and carbon dioxide proportions would be changed and the humidity high. The Carnation can slowly carry out its normal processes of maturation when stored in water at 33° F., but if stored without water the flowers tolerate the period of cold and, as little water is taken up, development is checked, and on placing again in water, at higher temperatures, the life of the flowers is longer than those held at low temperatures in water. It remains to be seen whether many other plants will respond to such treatment in a similar way, but possibilities of a new storage technique are opened up by this work.

(To be continued.)

BOOK REVIEW.

"The Reproductive Capacity of Plants." By E. J. Salisbury, C.B.E., D.Sc., F.R.S. Large 8vo. 244 pp. Ill. (G. Bell & Sons, London, 1942.) 30s.

From an ecological standpoint the question of the reproductive capacity of plants is of importance, but little work has so far been carried out in this direction. Only by the accumulation of a large number of detailed observations is it possible to arrive at any definite conclusions. Data on this point have been collected by Prof. Salisbury over a considerable period and in this book are presented in full detail, tabulated and examined. Some 240 species of British plants, belonging to very diverse ecological associations, have been investigated, entailing the examination of more than three-quarters of a million fruits; seed germination experiments have also been carried out on a large scale. The conclusions reached seem to show that fewer but larger seeds, with more reserve material for the developing embryo, are formed in plants living under the competitive conditions of close plant associations and that "the capacity to colonize in the face of competition appears to be associated with the amount of food reserve which the seed contains." Most parasites and saprophytes, however, produce minute seeds, which may be due to their unusual mode of nutrition. Plants belonging to such families as Orchidaceae, Ericaceae and so forth, which are characterized by the mycorrhizal habit, also have very small seeds. Such biological investigation is of great importance to the true understanding of plant relationships, and when the findings are set out in full detail as in this book, knowledge of the subject is very materially augmented, even if much still remains to be done.

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THE SECRETARY'S PAGE.

Subscriptions.—Fellows and Associates are reminded that their subscriptions to the Society fall due on January 1, and any changes in personal or bankers' addresses are particularly asked for so that tickets and JOURNALS may be forwarded punctually.

Programme, 1943.—The Annual Meeting to receive the year's report and accounts will be held on Tuesday, February 16, 1943, at 3 P.M. on the Society's premises. There will then follow a series of meetings, on April 13, May 18, June 15, a Fruit and Vegetable Show on July 13, an ordinary meeting on September 21, and another Fruit and Vegetable Show on October 5. At the meetings, commencing April 13, the Standing Committees will meet for adjudication on plants submitted to them. Fellows are invited to bring with them fruits, vegetables, flowers or plants, especially those of interest and of recent introduction. Full particulars as to the times when plants are to be brought and handed to the Committees will be published from time to time in the JOURNAL.

Demonstrations at Wisley.—The following demonstrations will take place at Wisley during 1943 :—

Vegetable Garden.

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|--------------|---|---|--|----------|
| March 3, 4 | . | . | Outdoor seed bed and seed sowing. | 2-4 P.M. |
| May 12, 13 | . | . | Control of vegetable pests and diseases. | 2-4 P.M. |
| May 26, 27 | . | . | Thinning, transplanting and successional cropping. | 2-4 P.M. |
| Sept. 15, 16 | . | . | Harvesting and storing. | 2-4 P.M. |
| Oct. 6, 7 | . | . | Digging, trenching, manuring and composting. | 2-4 P.M. |

Fruit Garden.

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|-------------------|---|---|---------------------------------|----------|
| March 31, April 1 | . | . | Spring spraying of fruit trees. | 2-4 P.M. |
| July 15, 16 | . | . | Summer pruning of fruit trees. | 2-4 P.M. |

Nov. 3, 4	.	.	Planting fruit trees and Roses.	2-4 P.M.
Dec. 1, 2	.	.	Pruning of fruit trees.	11 A.M.—1 P.M.

Flower Garden.

March 10, 11	.	.	Rose pruning and pruning of shrubs.	2-4 P.M.
June 2, 3	.	.	Summer pruning of shrubs.	2-4 P.M.
Aug. 18, 19	.	.	Vegetative propagation of plants.	2-4 P.M.

In case of bad weather, a talk with lantern slides will be substituted. Fellows and their friends are asked to notify the Director, R.H.S. Gardens, Wisley, nr. Ripley, Surrey, of their intention to attend.

In addition to the demonstrations, trials of Lease and Lend seeds of many kinds of vegetables, undertaken for the Ministry of Agriculture, and also Potatoes will be held.

Distribution of Seeds and Plants.—A distribution of seeds only will take place in the spring of 1943. At the request of the Ministry of Agriculture, the Society is undertaking extensive cultivation of crops of vegetable seeds which are likely to be in short supply during the war. As this national work will necessarily make great demands on the already much depleted staff, the Council regrets that it will not be possible to pack and despatch surplus plants this year. This list therefore is restricted to seeds only. Lists of seeds available and forms of application will be sent out with the January JOURNAL. Distribution will be made only to Fellows whose subscription for the year 1943 has been received.

The Society's Examinations.—Candidates who wish to enter for the Society's Examinations in Horticulture next year are reminded of the closing dates for entry forms as follows :—

General Examination (Senior and Junior)—Monday, January 11, 1943.

Teachers' Examination (Preliminary and Advanced)—Wednesday, December 16, 1942.

N.D.H. (Preliminary and Final)—Saturday, January 23, 1943.

R.H.S. Gardeners' Diary, 1943.—Copies of the R.H.S. Gardeners' Diary are now available. The selling price, including Purchase Tax, is as follows :—

In Pluviusin with back loop and pencil, 3s. 4d. post free.

In Morocco leather with pencil (not refillable), 6s. 1d. post free.

In refillable Crocodile Case with card and stamp pockets, 11s. 1d. post free. (Nearly exhausted.)

Refills for Crocodile Case, 2s. 4d. post free.

WISLEY IN DECEMBER.

THE season now ending has been remarkable for the unusually fine displays of flower, fruit and autumn foliage. The extremely floriferous condition of most of the ornamental trees and shrubs was largely due to the almost complete absence of the damaging spring frosts so often experienced at Wisley, while the mild and sunny April days assured perfect development of leaf and blossom. The collection of Rhododendrons on the north slope of Battleston Hill formed one of the most attractive features. *R. Fargesii*, *R. eucharites* and *R. Stewartianum*, opening in the first week in April, were rapidly

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NOTICE TO BINDER.

Volume LXVII has been issued in twelve parts, consisting of the "Journal" proper, pagged with Arabic figures, and "Extracts from the Proceedings," pagged with Roman figures, in Parts 1, 2, 4, 6, 8, 9, 10 and 12. The title and contents should be placed first, and be followed by the twelve parts of the "Journal" proper, with the illustrations in the centre in each case, and then the eight parts of the "Extracts from the Proceedings."

followed by dozens of species, of which a few of the most outstanding were *R. Wardii* and *R. litiense*, both covered with clear yellow flowers for a long period, *R. basilicum*, with immense, compact trusses above large, leathery leaves, fine blue forms of *R. Augustinii*, and the fragrant, wax-like varieties of *R. decorum*, *R. Loderi* and *R. auriculatum*.

Of the Japanese Cherries, all of which flowered with extreme freedom, *Prunus mutabilis* was, if possible, even more lovely than usual, although ten days earlier there was nothing comparable in beauty with the sweet-scented pink *P. Juddii* (*Sargentii* × *yedoensis*). Magnolias, too, gave a memorable display, both in the Wild garden and on Battleston Hill, where they enjoy greater security from frost damage.

Herbaceous plants generally have given a good account of themselves, and at the time of writing (October 26) there are still plenty of good flowers on the Dahlias and Chrysanthemums and several other plants, among which a trio of blue Salvias, *S. coerulea*, *S. uliginosa* and *S. azurea*, deserves special mention.

Of ornamental fruits there has been a rich harvest, and many, including those of the later-ripening Cotoneasters, like *C. serotina* and *C. glaucophylla*, and some species of Berberis, Euonymus and Rosa, will still be in good condition when these notes appear. Some usually unfruitful plants have been liberal this year. *Prunus incisa*, for example, ripened an enormous crop of small black Cherries (immediately taken by the birds); *Arbutus Menziesii* was covered in late October with grape-like bunches of scarlet berries. The last-named species flowers in spring and its blossoms are, therefore, less likely to be destroyed by frost than those of the hybrid *A. andrachnoides* which, during December, may be seen in flower at the north side of Seven Acres. Each mild spell brings out fresh flowers on *Viburnum fragrans* in many parts of the Gardens, and in the Wild garden *Mahonia japonica* is bearing pendulous racemes of fragrant, Primrose-yellow blooms.

There are very few other outdoor flowers, but colour is not lacking. In Seven Acres, falling leaves have revealed the prettily hued stems of the Dogwoods, Birches, Willows, Barberries and other shrubs. Evergreens, which are apt to be overlooked at the height of summer, assume fresh importance in mid-winter, when their qualities are more highly appreciated. In the Pinetum, as in the Wild garden and the collection on the bank overlooking the greenhouses, there are some good specimen Conifers, including Cypresses such as *Cupressus obtusa* var. *Crippsii* in pale gold, and the fine blue-grey Lawsons 'Triomphe de Boskoop' and *Allumii*. Others of equal merit are the blue forms of *Picea pungens*, the variously coloured varieties of *Cupressus pisifera*, and *Cryptomeria japonica* var. *elegans*, richly purpled during the winter.

THE WAR-TIME KITCHEN GARDEN.

DECEMBER.

Planning for next year.—At the end of the year the successes and failures that have attended the growing of extra food for the household may be reviewed and from the experiences gained plans for the following year drawn up. The vagaries of the weather may have accounted for some of the failures, but possibly it has been shown on more than

one occasion that certain crops do not do so well on the site available and these should not be attempted again ; it is better to give more space to vegetables that grow easily rather than to struggle, say, with plants on heavy clay that prefer a light loam. The quantity grown in each case should be considered to see if it was adequate to the household's requirements ; if there was a shortage or a surplus, adjustments should be made when ordering seeds for another year.

Review the past season's cropping results and try to account for any failures which have occurred with a view to obtaining better results in the coming year. Resolve to do all gardening operations methodically and in their proper season. Draw up a scheme in good time for cropping the garden and order the necessary seeds early.

Books on vegetable growing generally give a cropping plan which shows how the ground should be allocated and allows for a rotation of crops in three years. This, or some modification of it, is the usual method adopted where vegetables are grown in quantity as in a large kitchen garden or on an allotment. But under the present circumstances many people are growing vegetables where flower borders existed before, where lawns have been dug up—in fact, in various disconnected strips and patches about the garden, to which the directions for cropping a regular-shaped plot cannot apply. It is useful, therefore to know which plants can be grown on the same site year after year and which must be grown in different positions.

There are several reasons for changing the site on which a crop is grown from year to year ; different vegetables have root systems which reach varying depths and therefore draw their nourishment from different levels of the soil ; therefore where a shallow-rooted crop has been grown, the lower layers may contain a higher proportion of food material than the upper, so that a deeper rooting crop could usefully follow on. Some vegetables such as Celery, Leeks, Spinach, Lettuce, and, to a lesser extent, Peas and Beans, need a good deal of manure put in for their benefit in the preceding autumn and winter ; others prefer to be on ground that has been manured for the previous crop, for instance, Beet, Carrots and Parsnips.

Apart from the condition of the ground as regards the food material available, there is the question of diseases, and pests, for infection may remain in the soil. Onions, for instance, can be grown in the same place for several years with good results, provided they are healthy, but if any pests have attacked the crop, the site should be changed. With Cabbages and other members of the same family, these should always be grown in a different position each year owing to the danger of infection by Club Root.

Work to be done.—Digging, on suitable occasions, and tidying up are almost the only work possible now in the garden.

Frames.—Where crops are growing, such as Carrots, Cauliflowers, Lettuces and Endives, care must be taken to see that protection from frost is adequate and advantage taken of mild spells to ventilate freely. Watering should not be necessary, but the surface soil may be kept stirred and decaying outer leaves removed so as not to encourage pests and diseases.

Crops available from the garden in December.—Artichokes, Brussels Sprouts, Cabbages, Celery, Leeks, Parsnips, Savoys, Spinach Beet, Winter Cabbages. *From store.*—Beet, Carrots, Marrows, Potatos, Onions, Shallots, Turnips.

The Fruit Garden.—Once the ground has been prepared, get the

planting of new fruit trees and bushes done as soon as possible. Should the ground be wet, delay planting until the soil is friable. The trees and bushes will come to no harm if properly heeled-in. Take out a hole which will permit the roots being evenly spread out. Shorten the coarse and damaged roots. Set the tree in the hole and sprinkle fine soil amongst the roots. As the roots become covered tread firmly, alternately filling in and firming as the work of filling in proceeds. Firm planting is essential, but avoid deep planting by keeping the planting level of the tree at the same level as it was planted in the nursery. Trees planted in open sites should be staked to prevent the wind from swaying the tree and loosening the roots. Trees planted against walls should not be tied but left to settle down for a week or two, when they can then be tied to the trellis.

Push ahead with the winter spraying during favourable weather, spraying all kinds of fruit, excepting Strawberries, with a tar distillate wash. The object of this wash is to kill moss and lichen and to destroy the eggs of Aphides and Apple Sucker. Thoroughly wet every part of the tree or bush, ensuring that the wash is driven into cracks and crevices by using plenty of force. Make up the wash according to the manufacturer's instructions.

Note.—Tar oil will scorch green plants, so cover any vegetables or evergreen shrubs which may receive some of the spray drift. Look over the grease bands and remove any leaves which have blown on to the tacky material.

When unsuitable for spraying or pruning cultivate around the trees and bushes. Use a fork for this work and fork shallowly so as to avoid injuring the surface roots. Where wall trees have shown a lack in vigour, remove the top three inches of soil from the border and replace with some chopped-up turf to which has been added a little mortar rubble, wood ash and bone meal.

Overcrowded spurs on old Apple and Pear trees should be thinned out at pruning time. It is often advisable to remove every other spur, paying attention to the weak spurs. The longest of the retained spurs can be shortened back by half their length. The reason for this thinning is to reduce the number of fruit buds which become too numerous on old trees. The result is more growth, laying the foundation for young healthy spurs and better quality fruit.

THE CHINESE COFFIN TREES.

By EDWARD CAHEN.

IN the account of Dr. AUGUSTINE HENRY's life which appeared in this journal recently (*R.H.S. JOURNAL*, 67, p. 10, 1942), Sir FREDERICK MOORE told us how, when at Ichang in China, HENRY started making a collection of plants for his own pleasure, but was only able to get the Chinese names for them. Having carefully preserved a good few specimens he ventured to send some of them to Kew for identification. At the time Sir WILLIAM THISELTON-DYER was Director of Kew, so I asked Lady THISELTON-DYER about it. She replied that it was her husband who begged HENRY to go on collecting Chinese plants as he was sent to such out of the way places in the Customs

service. She told me that, among other plants, he had sent a piece of the tree from which the coffins of the mandarins were made. "Sir WILLIAM was delighted as for years he had been trying to find out from what wood these were made. I always understood that the Chinese made a great mystery of the Coffin Tree and would not let anyone know where it was to be found, till HENRY found it to my husband's great joy. I have a miniature coffin made of the wood of this tree, which HENRY gave me."

Shortly after this, Lady THISELTON-DYER sent me this little coffin (Fig. 127) as a present, well knowing my keen interest in the Coffin Tree. It is most beautifully made, obviously of Chinese workmanship, and the lid can be removed to disclose the interior, though I had had it a long time before I discovered this. One day I showed it to a naval man who happened to come in; he at once recognized it as a Chinese coffin before I had said a word, adding that he had seen them lying about, as the Chinese do not bury their dead; in fact, the coffins are often placed on a mound. This little model naturally set me thinking, for, like most people, I had assumed that the tree used was the so-called Coffin Juniper, *Juniperus Coxii*. But the date of the discovery of this tree by FARRER and COX, in 1920, or six years earlier by KINGDON WARD, did not fit in with HENRY'S sojourn in China. I therefore set to work to try and find out what connection there was between HENRY and the Chinese Coffin Tree. Not at all an easy matter, as I shall hope to show; but perhaps it will be just as well to recount the history of the Coffin Tree as far as it was then known to me.

1920. *Farrer's Coffin Juniper*.—E. H. M. Cox, in *Farrer's Last Journey*, gives a description of a Juniper which we now know as *J. Coxii*, though it was not described and named till much later. From this account I select a few passages which directly bear on the subject:

"Over this bridge [at Kang-fang in Upper Burma] are carried the remnants of what must have been at one time a great trade, and what even now must be one of the most odd exports in the world. These are planks from the Coffin Juniper. . . . The felling and hewing is left entirely to the Lissu inhabitants. Their only tool a native adze. . . . All through the colder months we constantly met coolies laden with their fragrant burden creeping up the steep hill past Hpimaw Fort and so over into China. When we were there, Chinamen in Tengyueh were paying no less than £70 for each plank, which must make it one of the most valuable timbers in the world, if not the most valuable."

There is a description of a thirty-foot seedling of this Coffin Juniper which is the only living specimen the two plant hunters saw, and from which they gathered seed and sent home. No dried material was ever sent back. From this seed originated all the Coffin Junipers in this country. Cuttings strike readily and the plant is very quick in growth as far as Conifers go. They also encountered "the burnt out stump of a giant, in which three of us took shelter from a shower."

1932. *Farrer's Coffin Juniper is named*.—In 1928 we find E. H. WILSON replying to a query by HENRY: "As regards the so-called Coffin Juniper of Yunnan, Mr. CLINTON-BAKER sent me specimens some time ago and we already had quite a little material [at the Arnold Arboretum] from the back blocks of Yunnan, mostly collected by ROCK. There is no doubt, in my opinion, but that it is plain *Juniperus Wallichiana*." It was this identification by WILSON that caused A. B.

JACKSON to look into the matter and finally name FARRER's Juniper. Incidentally this was the only reference, at the time, that I could find connecting HENRY with the Coffin Juniper. It was not till 1932 that JACKSON first described this tree in *New Flora and Silva* and named it *Juniperus Coxii* after FARRER's fellow traveller. The same story of the planks is repeated and there is a discussion as to the tree's nearest relative. FARRER and Cox found their specimen on the Burma side of the frontier between that country and Yunnan in South-west China, whereas KINGDON WARD had found it further north in the frontier territory between Burma and Tibet. In his book, *In Farthest Burma* (1921), he refers to the coffin plank industry as of importance on the frontier, and considers that the Government of India should take steps to protect the trees from becoming altogether extinct. He makes it perfectly clear that at that date he was under the impression that the coffin planks were obtained from *J. Coxii*; we shall find that some eighteen years later he had occasion to change his mind as to the tree from which they were obtained.

The Chinese call this Juniper Hsiang Mu, or "Scented-wood," which bears out what Cox says about "the coolies' fragrant burden." This fragrance makes the wood especially valuable for making coffins as it was supposed by the Chinese to act as a preservative. KINGDON WARD adds that they have a passion "for exhuming their corpses and burying them elsewhere. This is the remedy whenever the least hint, as reflected in the distress of the departed spirit, suggests that a site not in accordance with *feng-shui*, otherwise 'wind and water,' or luck, was selected for the grave." So it is evident that in some parts of China coffins are interred.

1939. *Doubt thrown on the Coffin Juniper*.—KINGDON WARD then brings the matter right up to date in two long and very interesting articles in the *Gardeners' Chronicle* in 1939, when he quotes from the diary of C. W. D. KERMODE of the Burma Forest Service. He toured in the Htawgaw Hills in March, April and May of the previous year: "We found here [Hpimaw] a number of coolies with coffin boards which they were taking over to China. . . . There seems to be considerable doubt as to the species which is used. I have seen Juniper mentioned, but I am inclined to believe that this is incorrect, and that it is the monotypic *Taiwania* which is employed." E. H. WILSON introduced *Taiwania* from seed he had collected in Formosa, and described the tree in the *Gardeners' Chronicle* in October 1920.

It is of interest to note that this tree grows with *J. Coxii* in the same district where FARRER and COX discovered the latter.

KINGDON WARD tells us that Juniper wood is used in China for making cheap coffins; he, therefore, considers it extremely unlikely that one particular Juniper would be signalled out to make high-class ones. He says that *Taiwania* is without any question the tree used by the Chinese to make the coffins for the wealthy, and gives the credit for this discovery to KERMODE. Unlike Juniper, *Taiwania* is rare, highly valued and expensive. It is the tree understood in the Hpimaw Hills to be the Coffin Tree by the Chinese, Lissus and Lashis. Even were this the case beyond all possible doubt, *Taiwania* could not be the tree which HENRY sent home to Kew for identification and from which my little coffin was made.

1942. *Henry's Coffin Tree*.—As a last resource I wrote to Mrs. HENRY, in Dublin, asking her whether she had ever heard her husband speak of the Chinese Coffin Tree. She had not, but was good enough

to look in *The Trees of Great Britain and Ireland*, by ELWES in conjunction with HENRY. Of course there was no mention of either *J. Coxii* or *Taiwania* there. This was in April 1942, and I was just giving up all hope of ever finding out what the tree was that HENRY had sent to Sir WILLIAM THISELTON-DYER when, on August 18, I received the following note from Mrs. HENRY: "Bearing your query in mind, and happening to look up *Libocedrus* for the owner of an exceptionally fine specimen, I came across an article of Dr. HENRY's which he had inserted in his working copy of *The Trees of Great Britain* under *Libocedrus*, and I believe it is exactly what you are looking for, about the Chinese Coffin wood, so I enclose the extract herewith." The article in question was from *The Garden*, dated September 13, 1902, long before either *J. Coxii* or *Taiwania* had been discovered:

"*Libocedrus macrolepis*, Benth. et Hook. has recently been introduced into cultivation in England by Messrs. James Veitch and Sons from seed collected at Szemao in Yunnan by E. H. Wilson, when he was paying me a visit at that station in the autumn of 1899. . . . In Southern Yunnan *L. macrolepis* is commonly planted in temple grounds, but it was observed and collected by me, growing wild in ravines at Talang, where it occurs near watercourses. Logs of the tree are frequently dug up by the natives in the forests close to the banks of streams. It was this dug-up wood which is especially prized by the Chinese for *making coffins of the most esteemed kind*. There is a large trade in coffin wood at Mapai, in North Tonking, which is reported to be similarly dug up, but I have not been able to verify the statement, or to identify the species concerned."

HENRY says that the Chinese name for *Libocedrus*, *Cupressus* and *Thuja* is Po, which means "white tree," on account of the purity of the wood of these trees. Some 2,000 years ago these Po trees were planted round the tumuli where were buried the feudal princes. "They were chosen as stately long-lived evergreen trees to symbolize the belief in immortality which was then, as now, craved by the human soul." At last, therefore, we are able to say quite definitely that my little model coffin is made of the wood of *Libocedrus macrolepis*.

Conclusions.—This does not exclude the use of many other trees for the same purpose. We have already discussed the question as to whether *Juniperus Coxii* or *Taiwania* furnished the fragrant planks that COX and FARRER saw being carried across the cane suspension bridge at Kang-fang in Upper Burma. In his book, *A Naturalist in Western China* (1913), E. H. WILSON has much to say about coffins and the wood from which they are made. *Cunninghamia lanceolata*, he says, was much used for this purpose on account of its fragrance. "For ordinary coffins several logs are dressed and fastened together laterally to form a thick, wide plank called 'Ho-pan,' four of which, with two end pieces added, make a coffin. All who can afford it have such coffins, lacquered a shining jet-black. But the more expensive coffins are those in which each Ho-pan is hewn from a single log of timber, and the most valuable of all are those from Hsiang Mu (fragrant wood), or Yin-chen Mu (long buried wood). . . . For the most part, Yin-chen Mu comes from the Chiench'ang Valley, where it was probably engulged as the result of an earthquake in times past."

HENRY quotes WILSON in his article on *Cunninghamia* in *The Trees of Great Britain and Ireland* (3, p. 494); thus showing that he was aware that more than one kind of buried wood was used in China for making the most expensive coffins. In HENRY we have no mere

traveller in China, but one long resident there, who understood the language and was greatly interested in the Chinese habits and customs. One has to live for many years in a country like China to get to know these local beliefs at all well, or even to be quite sure of the exact meaning of the Chinese words.

Appended is a list of the trees mentioned in this article as having been used for making high-class coffins in China :

Juniperus recurva Buch-Ham.

Himalaya ; Sikkim and Bhutan ; S.W. China.

A graceful distinct tree with dull coloured foliage. Branches curved downwards at the ends. Introduced in 1830.

Juniperus Coxii A. B. Jackson.

S.W. China and Burma.

Very like the above, with a single stem and graceful weeping branches. Many botanists regard it merely as a variety of *J. recurva*. The wood is very fragrant when fresh or burned. Introduced by FARRER and COX in 1920.

Juniperus Wallichiana Hook. f. ex Brandis.

Himalaya and S.W. China.

Not at all a common tree in gardens. Introduced by Sir JOSEPH HOOKER to Kew in 1849.

Taiwania cryptomerioides Hyata.

Formosa, especially on Mt. Morrison ; China, Yunnan ; Burma.

One of the tallest trees of the old world. It resembles *Cryptomeria japonica* in both the juvenile and adult state. The name is from the Chinese "Taiwan" for the Island of Formosa. In youth it is extremely elegant, the branches curved gracefully upwards, the branchlets slender and more or less drooping. Introduced by WILSON in 1920.

Libocedrus macrolepis Benth. et Hook.

China and South Yunnan.

First described as *Calocedrus macrolepis* Kurz in 1873 from a specimen collected by D. S. ANDERSON. A handsome conifer of the Thuja type, very tender. Introduced by WILSON in 1899.

Cunninghamia lanceolata (Lamb) Hook.

South and West China.

Handsome tree of broad-pyramidal habit ; tall and mast-like. Introduced in 1804 to Kew by WILLIAM KERR.

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THE PRUNING OF ROSES.

By MRS. A. DWYER.

DR. BRADFORD's article on the Science of Growing Roses, in the July issue of the R.H.S. JOURNAL, was bound to provoke discussion, and the vigorous rejoinder from Mr. SLINGER in the October issue, in which he counters flatly Dr. BRADFORD's conclusions, especially as regards pruning, will leave gardeners everywhere in a fog of uncertain bewilderment, unless some impartial attempt is made to evaluate the evidence, the arguments, and the issues involved ; and to give a lead in a controversy which has already persisted indeterminately through generations of Rose growers.

My contribution to the matter is based on the fact that as a Rose grower I am alive to the merits of long and short pruning—both of which I practise—and that I have grown Roses, not only in these islands, but also within the tropics, in Jamaica and India. I think the whole foundation of all this divergence of opinion and pruning practice is due to the fact that Roses here are not usually grown on their own roots, but are budded on to a far more vigorous stock. This permits the grower to prune to a degree which would be injudicious, and indeed would lead to definite failure, if Roses were grown on their own roots. That it can be done with apparent impunity does not prove that hard pruning is right, or that it is scientifically sound, and physiologically correct. It is more or less successful in spite of being hard, not because it is hard.

Briar stocks especially are so vigorous, so inherently alive, that they will stand abuse and maltreatment which would, for most plants, be fatal. Whether I long-prune or hard-prune my Roses is, accordingly, a matter of my own wishes and what I seek to obtain. Thus, in my formal beds, I hard-prune because I wish level, compact, moderate-sized bushes which will flower from, say, mid-June until mid-October. There are, however, in other parts of my garden great Rose bushes which have been long-pruned over a number of years, which yield unending masses of beautiful blooms from early May until late in the year, and from them I have garnered the contents of many a Rose bowl as late as Christmas Day. I never get such early, and rarely such late, blooms from my hard-pruned rosebeds where the year of the Rose is brief.

Now in Jamaica and India it is usual to grow Roses on their own roots from cuttings, and such plants are universally long pruned. In parts of India like the United and Central Province, where bungalow gardens usually have hundreds of Roses, mostly grown in great chatties (giant flower pots of baked earth up to 2 feet or more in width), it is the practice to give an artificial winter to the Roses at a season determined by reference to the rains. The Rose plants, still in full leaf, are turned out of the chatties, stripped of soil and stored away in a dark shed for three or four weeks. At the end of this resting period they are repotted in fresh soil, watered and long-pruned, exactly on the lines so well described by Dr. BRADFORD in his article. They do very well indeed and give good blooms for about eight months each year over many seasons, but they certainly would not stand the hard pruning advocated over here for budded Roses. In Jamaica the procedure is different. The Roses there are grown on their own roots

from slips ; they are in the fullest sense perpetual flowering ; are long pruned, if pruned at all, and deteriorate unless care is taken to restrain over-flowering by judicious disbudding, which has to be still more complete for a period each year during the warmer months. The stock is frequently renewed from freshly rooted slips.

A heavy clay soil is usually accepted here as being the best for Roses. I think the significance of this is that the system of hard pruning which is now almost universal can be carried out with the greatest impunity on budded Roses grown in such a soil. It should, however, be modified, even for formal Rose beds, where conditions are less favourable. Mr. SLINGER is a little severe in his comments on the photographed specimens of a Rose, 'Portadown,' which illustrated Dr. BRADFORD's article. They were somewhat ill-chosen if intended to represent a Rose-bush at its best, but they were no doubt selected to exemplify as simply as possible the detail of long pruning. The fashion of hard pruning will doubtless continue ; it has its uses and abuses, and the wise rosarian will make the best of both methods, each modified to his garden's requirements, to the soil and to the climate.

HYLOMECON JAPONICUM.

THE subject of this note, which FARRER found " lovely with its golden flowers in the woods above Nikko in March," is quite the best of its nearer allies in garden value, yet it is one of the least known. It seems to have been introduced some seventy years ago under the name of *Stylophorum japonicum*, but has, so far as I am aware, always been rare, and this is surprising, for in charm of flower, hardiness, permanence, ease of propagation and other garden virtues it excels.

A hardy herbaceous perennial of the Papaveraceae, *Hylomecon japonicum* spreads slowly into a massive clump. The five-parted deep green glossy leaves stand thickly and erect at a height of some eight inches, and above these, on stalks of about four inches, flowers appear in profusion in April and May. These flowers, saucer-shaped and one and a half inches across, are a glistening golden yellow, considerably richer in tone than those of any *Stylophorum* we have grown, and they have a remarkably telling " backcloth " in the rich verdure of the foliage. With us the plant revels in a cool, fairly stiff loam with complete summer shade from some Magnolias. It is easily increased by detaching offsets, these being generously provided with fibrous roots. A most admirable and entirely non-offending plant for such a soil and site as I have suggested, and one affording an example as to how a subject of merit may, through no fault of its own, long remain in obscurity.

A. T. JOHNSON.

THE CARE OF CUT FLOWERS.

By M. A. H. TINCKER, M.A., D.Sc., F.L.S.

(Keeper of the Laboratory, Wisley.)

(Continued from p. 380.)

Later Temperature Relationships.—The freezing points of the petals of a number of flowers have been observed by WRIGHT and TAYLOR (79) and by WRIGHT (78). The flowers tested included Carnations and Chrysanthemums freezing at 28.4° F., Narcissus 'Sir Watkin' 30.1° , Gardenia 28.3° , Anemone 28.1° , Ranunculus 28.6° . Roses and Cattleya Orchids tested were damaged at temperatures of 30.4° and 30.8° F. respectively. Flowers can withstand temperatures just below freezing point, so that there is little likelihood of damage from low temperatures in houses and heated buildings; but in transit in cooled vans it is necessary to prevent freezing, and thermal insulation by the use of moist newspaper which remains at 32° F. has been suggested by HUKILL and WRIGHT (32). Paraffin waxed boxes and wrappers have been found beneficial in the States for thermal insulation.

Exhibits of flowers, in ice, from the Dominions, seen at Wembley, 1924, and at the Coronation Empire Exhibit, Chelsea, 1937, prove that under continuous low temperature, without periods of higher temperature and aeration, the floral tissues long maintain almost their natural colour and appearance.

High temperatures, on the other hand, frequently accompanied by lack of moisture, decrease the life of cut flowers. Carefully controlled experiments designed to test various flowers at constant temperatures were carried out by HITCHCOCK and ZIMMERMAN (32); they found that *Coreopsis* lasted four times as long at 41° F. as at room temperatures, whilst *Cosmos* did not benefit so much by low temperatures. By nightly transference to lower temperatures of 50° – 59° F. the life of flowers of *Coreopsis* was slightly prolonged; by permitting the flowers to enjoy a day at lower temperatures a further increase was gained. Flowers of *Gladiolus* and *Coreopsis* kept cool and then subjected to higher temperatures did not last long, the former only a few hours.

Humidity and Temperature.—That these temperature results are so very closely related to the atmospheric humidity was shown particularly well by Carnations, which showed a favourable response to high humidity, and to a narrow difference of 98 per cent. as compared with 80 per cent. The value of low temperature to this flower was increased at high humidity; the Carnations kept as well at the lowest humidity of only 15 per cent. at 41° F. as they did in the saturated atmosphere at room temperature. Roses did not respond so markedly to high humidity, and Dahlias gave somewhat inconsistent results.

These carefully controlled scientific experiments are in the closest agreement with experience gathered by keen observers in the florists' trade and by amateur gardeners. STEVENS (60), discussing the lasting quality of flowers, stated: "Quite unconsciously during the last few years we have become a 'central-heated' nation, and this has profoundly affected the lasting capabilities of flowers. It is little realized how vast the change has been. Statistics tell us that from November to April the old-fashioned, pre-central-heated house was rarely more



Photo, N. K. Gould]

FIG 124.---RHODODENDRON STEWARTIANUM.

(See p. 382.)



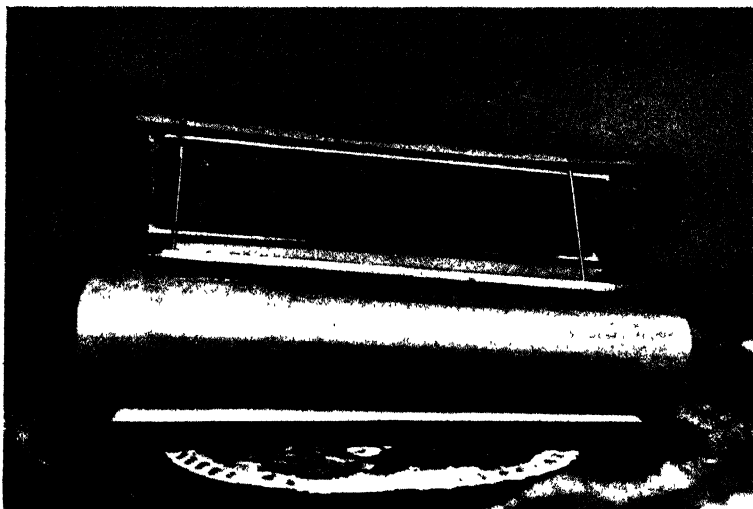
Photo, N. K. Gould

FIG. 125.—*PRUNUS INCISA*.
(See p. 383.)



Photo, N. K. Gould]

FIG. 126 -- ARBUTUS MENZIESII
(See p. 383)



Photo, E. Cahen.

FIG. 127.—MODEL OF CHINESE COFFIN.

Length, 4 inches . width, 2 inches one end, $1\frac{1}{2}$ inch at the other
(See p. 386)



Photo, E. Cahen

FIG. 128.—JUNIPERUS COXII.

Young tree in Mr. Cahen's garden, showing characteristic habit.
(See p. 389.)



Photo, N. K. Gould.]

FIG. 129.—*FORSYTHIA INTERMEDIA SPECTABILIS*.
(See p. 401.)



Photo, Abbing]

FIG 130 — GERANIUM IBERICUM



Photo, Malby.

FIG. 131 --*GLEDITSIA TRIFOLIATA*
(See p 401)



FIG. 132.—NERINE 'DUNKIRK.'
(See p. 403.)

than 50° F. during the day, except immediately round the fire, and at night, when the fire was out, it was even lower still. Now we live in an era when flowers have to stand up to a temperature of 70° F. or more during the day and there is no respite at night when they need it. With thermostatic control and closed windows, for the hotter the room the more draughts are liable to be felt, the unfortunate flowers are boiled all day and fried all night.

"Even under these conditions the public could very often save their flowers if they would remove them to a cool room during the night to allow them to recuperate. If that is impossible, then they should be put on the ground, where the temperature is some degrees lower than it is on a pedestal about ten feet above floor level. If the windows were left open at night in a centrally-heated flat and the flowers treated in this manner, they would often recover their crispness by the morning. Cut flowers indoors will very often last at 50° F. for three weeks. They will last at 60° to 65° for five or six days, but at 70° for two or three days at the most.

"Central heating has vastly increased the problems of flower distribution, and the percentage of complaints received has trebled in the last five years. When we follow these up, which we always do, and bring the flowers back to the shop and put them up to their necks in water in a cool place, they invariably revive."

Mechanical Devices.—A number of artificial devices are used to preserve the shape and form of cut flowers; for example, with *Callations* the calyx is kept as a support for the corolla by prevention of its expansion by means of small rings of covered metal or of rubber. To keep petals open small drops of paraffin wax can be used in *Water-Lilies*, and gelatin has been recommended by DE WERTH (70) for application in small quantities to *Poppies*; such methods have not made a widespread appeal.

Chemicals added to the Water.—From time to time claims have been made that chemicals added to the water prolong the life of cut flowers placed in the water. The majority of the chemicals used may be placed in these categories:

- (1) Chemicals definitely bactericidal or retarding bacterial development.
- (2) Chemicals, organic and inorganic, that may take part in the metabolism of the plants, e.g. sugar, mineral salts.
- (3) Chemicals intended to control respiration, e.g. hydrozene sulphate.
- (4) Drugs available in households, e.g. aspirin.

DUCOMET and FOURTON (22, 23) tested the influence of a large number of chemicals used at different concentrations in the water in which were placed cut flowers of twelve different species. They reported that traces of mineral substances used at 1 part per 10,000 gave favourable results, and that organic substances, including sugar, also gave favourable results at a higher concentration of 1 per cent. or even as much as 10 per cent. The salts used included potassium nitrate, chloride (as Kainit), sulphate and phosphates. In extended work, including some 10,000 tests with more than 100 species, these authors later (1908) recommended sugar as one of the most useful substances; the concentration found satisfactory differed widely from 2 to 20 per cent. Exceptions were noted, *Lilies*, *Lilac* and *Pelargoniums* amongst others, whilst *Tulips* and *Chrysanthemum lacustre* derived no benefit from such treatment. A few of the concentrations

recommended were: for Roses 7-10 per cent., for Chrysanthemums 15-17 per cent., and *Lychnis chalcedonica* only 5 per cent. They found sugar superior to such salts as nitrate, chloride or sulphate of potash and sodium. The phosphates gave inconclusive results differing with various plants. Favourable treatments extended the life of the flowers from four to ten days longer than plants in water. Despite the classification of the chemicals as favourable to longer duration, unfavourable, indifferent and definitely injurious, no general statement of the underlying principles was made. ARNOLD (9) reported favourably on the use of 5 per cent. solutions of glucose and cane sugar for Chrysanthemums, Gaillardia, Nigella, Petunias, Snapdragons and Sweet Peas, but found salt harmful.

These results yet await detailed confirmation by others. KNUDSON (37) used many similar treatments in his American experiments, mostly made with flowers of short duration. In general he failed to confirm the French results, but he did record that a mixture of the chlorides of calcium and strontium and of barium and calcium, and also zinc sulphate alone delayed the decay of African Marigold and Zinnia.

LAURIE (38) tried various chemicals and was able to obtain differences in duration of the cut flowers of several days. He tested salt, formaldehyde, camphor, ammonia, sulphur dioxide and listerine. These prevented bacterial action, and in this way when used in very dilute solutions they aided longevity of the flowers. With Carnations a trace of boric acid, 1 part per thousand, or of permanganate, produced some effect. Using sugar, LAURIE (38) found Asters responsive to a 1 per cent. sugar solution—about 1 teaspoonful to 1 quart of water—and that their life as cut flowers was so doubled. Dahlias and Hollyhocks benefited by a weak solution of potassium nitrate at 1 part per thousand. LAURIE also tested aspirin and found one-half tablet in 2 quarts of water improved the keeping qualities of the above-mentioned flowers.

HITCHCOCK and ZIMMERMAN (32) tested forty-one chemicals, including nutrient solutions, potassium and sodium salts, camphor, aspirin and copper salts. The plants used were Antirrhinum, Aster, Chrysanthemum, Coreopsis, Cosmos, Dahlia, Delphinium, Gladiolus, Phlox and *Lilium speciosum*. Their results are clearly stated—"None of the compounds was noticeably effective in prolonging the life of cut flowers"—although some of the solutions of low concentration were slightly beneficial or non-toxic. In concentrations greater than 1 part per 10,000 injury resulted from the addition of acetyl salicylic acid (aspirin) and copper salts. These workers carefully considered the variations in the material at their disposal and found that these were as great as the observed differences between treated and control samples, and therefore any beneficial effect observed was not significant—it was merely a sampling fluctuation. Potassium permanganate prevented the rapid decay of the flower stems of Asters and Phlox, but did not prolong the life of the flowers. PETTS (52) suggested the use of Condy's fluid, a weak solution of permanganate, as an effective chemical; such oxidizing chemicals tend to check anaerobic bacteria and probably retard the blocking of the water-conveying tubes.

SCHULL (57) made carefully controlled experiments with both wild and cultivated plants, testing the effect of aspirin on them. All the results refuted the claims that such drugs prolong the life of flowers; on the contrary, the use of aspirin resulted in injury often shown in a day by marginal scalding and dying of the foliage and premature drooping of the flower. These findings received ample confirmation in

GILL's (27) experiments, also made with wild flowers—he used Bluebells—and cultivated plants such as Dahlias, Pinks, Snapdragons, Tulips and Wallflowers. KOEHN (36) mentions the successful use of camphorated oil, peppermint oil, and the insertion of peppercorns in split stems; as well as alum, acids and alkalis and alcohol, as aids to longevity.

Traces of copper have been found to influence the life of some flowers; copper is well known to inhibit the development of many bacteria and fungi.

LAURIE (41), reviewing the work at the Boyce Thompson Institute, Cornell, Illinois, Iowa and Ohio research stations where research in floriculture takes place, is of the considered opinion that substantial progress has not resulted from the use of chemicals, and it is seen that this opinion is endorsed by HITCHCOCK and ZIMMERMAN (32), DORNER (21), SCHULL (57), GILL (27) and others.

Briefly, scientific experiments have failed in the majority of controlled tests to confirm the value of chemicals added to the water. Possibly the use of a more potent, cheap, bactericidal drug, such as used in other sciences, may keep the water free from bacterial development sufficiently well to justify its future widespread use, but it must not injure the cut flowers. Repeated changing of the water accomplishes much and is the cheapest method.

Vases.—Some years ago the manufacturers of a proprietary glass used for flower vases submitted to Wisley examples of various shapes of these vessels for trial in the hope that this glass might prove superior to other containers for cut flowers. It had been suggested to the makers that the quality of the transmitted light might influence adversely the bacterial content of the water and so keep it clean. Critical tests were made with a number of species of perennials and some annuals, but the lasting property of these flowers was not increased by these vases, when the data were analysed statistically. There is, however, some evidence collected in other tests made in America that sufficient copper may dissolve from copper vessels to retard to some extent bacterial development (see RATSEK (52)). Generally the shape or form of containers has been shown to have little effect provided that adequate aeration of the surface of the water can take place and that there is always sufficient depth of water.

Conclusion.—In conclusion the following points are reiterated:

(1) Preliminary saturation with water is generally profitable; there are exceptions, notably *Gladiolus*.

(2) Cool storage conditions generally a few degrees above freezing point maintain plants fresh. Some cut flowers may in future be packed dry in special moisture retaining containers at this temperature.

(3) With cut flowers every effort should be made to keep the channels for water uptake clear: by repeated cutting, which may be more advantageous if done under water; by changing water frequently and by preventing leaves from soaking in the water. The above precautions tend to reduce or retard bacterial development.

(4) Chemicals are not recommended for general addition to the water for this purpose, as no highly effective harmless chemical has yet been satisfactorily used. The addition of calcium nitrate to Tulips to prevent or cure "topple" is a special exception.

(5) The most certain way to prolong the life of cut flowers is to lower the temperature of the rooms which they decorate, if not for the full 24 hours, at least at night, and so permitting the flowers to recover their natural high moisture content.

ROOT REGENERATION IN SOME ROSE STOCKS.

By L. G. G. WARNE, M.Sc., Ph.D., and L. FOTHERGILL, M.Sc.

(Botany Department, Manchester University.)

ABILITY to regenerate roots after severe damage to an existing root system is a desirable feature in garden plants that are normally transplanted. Especially is this so when transplanting involves, as it often does with Roses, prolonged exposure of the roots with consequent risk of death of much of the root system by desiccation. In connection with experimental work on Roses we had occasion to examine the ability of various Roses used as stocks to regenerate roots after severe root pruning, and the results show that the Roses differ appreciably from each other in this respect.

The material used in the experiment comprised ten two-year-old plants of each of the stocks known commercially as 'Kokulensky,' 'Multiflora,' 'Laxa,' 'Brog's Canina' and 'Polmeriana.' Some plants of 'Rugosa' were included also, but they could not be planted at the same time as the other bushes.

Each plant, previous to planting, was pruned to three shoots of two buds each and all the main lateral roots were removed so that only that portion of the main root which appeared to be a mere continuation of the shoot remained. The pruned bushes were planted in 6-inch pots in January in a compost consisting of one part of loam and three parts of sand, in a temperate house. The 'Rugosa' bushes were not planted until February. A further set of bushes similarly treated were planted outside in heavy soil.

Examinations of the indoor bushes were made in May and July and of those growing outdoors in July, and on each occasion the roots and shoots that had developed since planting were removed and their dry weights obtained. The data collected in this way are incorporated in Table I.

TABLE I.

<i>Dry Weight of Roots in Grams.</i>							
Date.	Situation.	Kokulensky.	Laxa.	Multiflora.	Brog's.	Rugosa.	Polmeriana.
May 20	Greenhouse	0.21	0.28	0.10	0.33	—	0.67
July 28	"	1.47	2.31	—	3.73	1.27	3.50
July 28	Outdoors	0.09	0.24	0.10	0.24	0.53	0.03
<i>Dry Weight of Shoots in Grams.</i>							
May 20	Greenhouse	2.91	3.33	0.35	2.05	—	3.11
July 28	"	3.13	5.68	—	8.47	4.39	9.45
July 28	Outdoors	1.46	4.33	1.75	6.66	2.05	4.70

Undoubted differences in the readiness with which the different stocks regenerate roots are revealed by the data presented in this table. Certain stocks, especially 'Polmeriana,' show very rapid root regeneration. This stock by May 20 had produced more than double the amount of root shown by any of the other stocks, although by the second sampling date its root growth was exceeded by that of 'Brog's Canina.' Outside in heavy soil 'Polmeriana' showed up much less favourably.

These absolute root weights however are difficult to interpret as the original stocks, as planted, differed considerably in weight. As, however, the weights of the stocks at planting are known, it is possible to express dry weight of root produced as a percentage of the original weight of the stock. This comparison of dry weight of root with fresh weight of stock, although not ideal, probably gives a fair measure of the ability to regenerate roots. In Table II. are set out the data obtained in this way for the July sampling.

TABLE II.

Dry Weight of Root as Per Cent. of Original Weight.

Situation.	Kokulensky.	Laxa.	Multiflora.	Brog's.	Rugosa.	Polmeriana.
Greenhouse .	4·13	12·8	—	4·6	1·6	13·7
Outdoors .	2·1	1·2	1·8	1·1	0·3	1·2

Again the poor root development of the plants outdoors in heavy soil is evident. Both the indoor plants 'Polmeriana' and 'Laxa' show rapid root regeneration, with 'Rugosa' regenerating roots very slowly, and it is unlikely that the low value for 'Rugosa' is due entirely to the later planting of the 'Rugosa' bushes as it occupies an equally unfavourable position when the outside bushes are considered. Outside 'Polmeriana' and 'Laxa' show no advantage over the other stocks, appearing in fact to be inferior to 'Kokulensky'—suggesting not only that the stocks differ in their ability to regenerate roots but that they react differently to changes in environment. 'Multiflora' behaved in a peculiar manner. Immediately after planting shoot growth commenced before any root development had taken place. In consequence of this in most bushes the new shoots withered and the shoots died. Outdoors where low temperature retarded bud break, although root growth was small, yet in relation to the size of the bushes it was comparable with that of the other stocks and appeared sufficient to maintain the bushes in health.

It would appear therefore that the stock 'Rugosa' when severely root-pruned is, compared with the other stocks tested, slow in regenerating root, whilst 'Multiflora,' with its tendency to premature shoot growth in the spring, is able to establish itself after severe root pruning only when conditions are such that shoot growth is suppressed until such time as some root regeneration has occurred, suggesting that with this stock transplanting in late spring is inadvisable. All the other stocks established themselves satisfactorily in spite of the severe treatment to which they had been subjected.

A smaller experiment with two of these stocks, namely 'Multiflora' and 'Polmeriana,' worked with the variety 'Etoile de Holland' showed that root regeneration was affected by the scion. Root production here was more rapid than with the unworked stocks as is seen from the data below, but later falls off so that by July root production is less with the worked bushes than with the unworked stocks. Further 'Multiflora' when worked with a scion variety established itself satisfactorily. As a stock it did not induce in the scion the premature bud break which characterises its own shoots and so in the worked bushes root regeneration was always sufficiently rapid to maintain the health of the bushes.

TABLE III.

Dry Weight of Roots in Grams produced by Stocks worked in the Variety 'Etoile de Holland.'

Date.	Situation.	Multiflora.	Polmeriana.
May 20 . . .	Greenhouse	0.39	0.20
July 28 . . .	"	—	0.56
July 28 . . .	Outside	0.08	0.07

Again root regeneration outside is greatly restricted, but no significant differences exist between the two stocks, although indoors the bushes on 'Multiflora' produced roots more rapidly than those on 'Polmeriana.'

The authors are indebted to Dr. F. W. SANSOME for arranging a supply of suitable material for this work.

HOEING.

A NUMBER of letters have been received on the subject of hoeing, following Dr. KEEN's account of experiments carried out at Rothamsted. Different aspects of the subject have appealed to different contributors; for instance, the statement that "water does not move up from below to replace that lost as it should do on the capillary theory" is challenged by a correspondent who has had experience of agriculture in New Zealand under conditions of extreme drought, where he says the continuous use of cultivators made it possible to get perfect germination of Mangolds after three months of absolute drought; he also draws attention to the fact that Dr. KEEN's experiments have been entirely with root crops which are tolerant of a certain amount of drought and are inclined to develop foliage at the expense of their roots if there is excess moisture, and he suggests that it would be interesting to have the experiments carried out with Peas or Broccoli in a dry season.

A gardener with long experience writes: "First I would like to focus attention on the fact that the term 'hoeing' does not have quite the same interpretation agriculturally as horticulturally. One can infer that, when hoeing or cultivating is mentioned in the article, it is in reference to horse or tractor cultivation, say, from 3-6 inches in depth, whereas to the gardener hoeing would most often imply the use of hand tools working to a depth of $\frac{1}{2}$ -1 inch; this corresponds more to the very shallow surface scraping referred to. It seems then that, although a gardener might waste his time by continually 'running through' weedless ground during the summer, he would not be likely to cause actual harm. However, as gardeners no more than anyone else wish to waste any time in useless jobs, this article may be the means of alluring those who carry out such summer hoeing in weed-free soil to relax their efforts with a good conscience. For my part I am inclined to think that most gardeners of my experience would, in spite of adherence to theories of the capillary action of water, perhaps outworn, have come to the conclusion from their own observations

that such hoeings have no apparent effect. And here, of course, lies the difference from the apparent effect of these hoeings early in the season among the young seedlings. I say 'apparent' advisedly, because the average gardener has not always reached his conclusions in scientific strictness, and it is possible to be deceived by the appearance of plants standing out in tilled ground as against those in untilled. However, most of us agree that plants often make a big jump after such early hoeings and would also agree that one, at least, of the reasons for this would be that the soil in the early part of the year is likely to be cold and wet, and that the hoeing, by drying or partly drying the upper surface, helps to warm it."

Another correspondent, who takes the view that "there does not appear to be anything in Dr. KEEN's article which should cause the slightest lack of confidence in hoeing, rather the reverse," is of the opinion that, in addition to its beneficial effects in connexion with soil moisture, hoeing helps in the control of insect pests by disturbing them and rendering them an easier prey to birds. And as a garden is not merely a place for producing something to eat, no doubt many will share his dislike of an unhoed surface which "looks rather like the bottom of a dried-up pond."

The growing of Potatoes without earthing up has also attracted attention, and it has been pointed out that as it frequently happens that the uppermost tubers are the best, it will be some of the best which will be spoilt by greening if earthing up is omitted. It is also stated that there is some evidence that the covering provided by earthing up tends to protect the tubers from blight, and that this is especially important under garden conditions where spraying is less frequently practised than on farms.

THE AWARD OF GARDEN MERIT.—LXX.

312. GERANIUM IBERICUM.

Award of Garden Merit, July 13, 1942.

Good garden Geraniums are attractive additions to the flower border; unfortunately this genus cannot be relied on to produce good garden plants, and too many of the species are little better than weeds. Amongst those which are worth growing is the Caucasian *Geranium ibericum* whose branched erect stems reach a height of 1-1½ feet; the woolly leaves are deeply cleft into 5-7 lobes, whose edges are toothed. The flowers, held in loose panicles, are about 1 inch in diameter and of that shade of violet by courtesy called blue. The plant is figured in the *Botanical Magazine*, t. 1386, and Fig. 130.

A better plant than the type is the variety *platyphyllum*, which makes a more handsome clump with leaves less deeply lobed and flowers of a richer colour, purple veined with crimson. The differences between the two plants are sufficient for the variety to have been accorded specific rank as *G. platyphyllum*. Both plants are perennial and form clumps which are best left undisturbed for several years, when they will produce an abundance of flowers for a week or two in June. They can be propagated by division in autumn; seeds are plentifully produced, but poor forms with slatey-blue flowers may result, so that vegetative propagation is more satisfactory.

313. EPIMEDIUM PINNATUM.

Award of Garden Merit, July 13, 1942.

The *Epimediums* belong to the family *Berberidaceae* but, unlike the *Barberries*, they are herbaceous not shrubby, the leaves arising from a network of very slender underground stems. The foliage is characteristic: the leaves are compound, the leaflets generally cordate and sometimes asymmetric, borne on long slender stems; they may be all basal or some may be borne on the flower stalks. The inflorescence is a simple or compound raceme, the pedicels being long and slender; as in *Berberis*, the sepals are petaloid, the petals being reduced to nectaries, often spurred. Seed is seldom produced in this country.

Epimedium pinnatum is botanically a collective species including several geographically distinct types, the subspecies grown in gardens under this name coming from Western Transcaucasia. The plant is about 10–15 inches high and the leaves all arise from the creeping rhizomes; they are biternate, the nine leaflets being ovate with deeply cordate bases and spiny tips; the edges are serrate and sometimes spiny; they increase in size up to some 3 inches long after flowering time. The flowering stem is leafless and bears from 12–30 flowers, whose petaloid sepals are bright Aureolin yellow; the nectaries are very small, the stamens protruding. It is essentially a woodland plant, best accommodated in shady parts of the rock garden or the moister parts of the herbaceous border; it likes cool leaf mould in which the rhizomes run freely but not invasively. The bronzy colouring of the young foliage is delightful, and the delicate sprays of bright yellow flowers appear in April. In autumn the leaves may again change colour, but in sheltered positions the foliage is evergreen. It is readily propagated by division of the rhizomes in autumn or when growth is just beginning in very early spring.

Epimedium pinnatum was introduced to European gardens about 1842 under the name *E. colchicum*; it differs somewhat from the typical *E. pinnatum* from Persia, which is not in cultivation, but not sufficiently to be regarded as a distinct species, and in the latest revision of the genus it is recognized as *E. pinnatum* subsp. *colchicum*. It is illustrated in the *Botanical Magazine*, t. 4456.

314. CLEMATIS × DURANDII.

Award of Garden Merit, September 14, 1942.

The variety and beauty of the climbing *Clematises* has somewhat obscured the herbaceous types of the genus which, nevertheless, are valuable border plants. One of the best of these is *Clematis* × *Durandii*, a hybrid between the herbaceous *C. integrifolia* and the climbing *C. lanuginosa*. This fine plant was rather overlooked for some years after its introduction in 1874, when a note appeared in *The Garden* (5, p. 350, 1874): "MM. Thibaut and Keteleer announce, under the name of *Clematis integrifolia* de Durand, a new hybrid between *C. integrifolia* and *C. lanuginosa*. It grows 4½ feet high and bears dark violet velvety flowers each from 3 to 4½ inches across, with yellow stamens. It blooms continuously from the end of May till the middle of October." In a later number of *The Garden* (49, p. 98,

1896) attention is again called to this hybrid and a coloured plate given. There seems some doubt whether the second parent was the true *C. lanuginosa* or perhaps one of the *Jackmani* hybrids; the flowers certainly resemble those of *C. × Jackmani* and are very lovely. BEAN says that the plant grows to 9 feet high, and certainly the 4½ feet of the original notice is less than is usually attained. It can be grown against a wall or trellis, or is valuable in the herbaceous border, where it should be given some light support.

315. GILLENIA TRIFOLIATA.

Award of Garden Merit, September 14, 1942.

An old plant, cultivated by PHILLIP MILLER in 1758, *Gillenia trifoliata* still holds its place in the garden to-day. It is a hardy perennial from the Central and Southern United States, with trifoliolate leaves on stems some 2-3 feet high; the petals are narrow, strap-shaped and unequal in length, white or pinkish, the persistent calyx turning red after the petals have fallen. Individually the flowers are not striking, nor do they readily suggest the family Rosaceae to which the plant belongs, but the loose panicles in which they are held have an airy grace that makes *Gillenia* a welcome addition to the herbaceous border or larger rock garden, or with the *Astilbes* in the bog garden; the flowering period is mid-summer prolonged into early autumn. The plant grows easily, preferring a moist situation, and can be propagated by division or by seed. There is an illustration in the *Botanical Magazine*, t. 489, under the name of *Spiraea trifoliata*; see also Fig. 131.

The Award of Garden Merit, which was instituted in 1922, is given by the Council on the recommendation of the Wisley Garden Committee to plants which have proved their worth and hardiness, are not difficult to procure, are of outstanding merit in their class and do not require special treatment to produce the best results. So far three hundred and fifteen plants have received this award and descriptions of them have been given in the JOURNAL from time to time. In 1929, under the title of *The Award of Garden Merit, Part I*, descriptions of the first hundred plants were published, without illustrations; later these were incorporated with descriptions of another one hundred and twenty-six plants in the volume *Some Good Garden Plants*, published in 1938, with twenty-six illustrations. When circumstances permit it is hoped to bring out a revised edition into which it is planned to introduce a greater number of illustrations, and these are being collected as opportunity offers; some will appear in the JOURNAL from time to time. In the present number there is an illustration (Fig. 129) of *Forsythia intermedia spectabilis* which shows the freedom with which this popular shrub produces its golden flowers; it is probably of hybrid origin and a description will be found in the R.H.S. JOURNAL, 48, 1923, p. 226, and also in *Some Good Garden Plants*. In the *R.H.S. Diary* is given each year a list of the plants which have received the Award of Garden Merit since the last collected publication of descriptions.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1942.

Chrysanthemum 'Hurricane.' A.M. September 29, 1942, as an early-flowering variety for exhibition. Flower stems stiff, 16-18 inches long, clothed with dark green foliage. Flowers double, flattish, 5 inches diameter, a deeper tone of Currant Red (H.C.C. 821) with a gold reverse; petals semi-rolled. Shown by Mr. H. Shoesmith, Mayford, Woking. See p. li.

Chrysanthemum 'Lovelace.' A.M. September 29, 1942, as an early-flowering variety for exhibition and market. Flower stems stiff, 18-24 inches long, clothed with medium sized foliage. Flowers double, 4 inches across, Amaranth Rose (a tone between H.C.C. 530/1 and 530); tips of petals tinted cream; petals stiff, outer horizontal, inner incurved. Shown by Messrs. J. & T. Johnson, Tibshelf, Derbys. See p. li.

Chrysanthemum 'Mosquito.' A.M. September 29, 1942, as a variety for exhibition. An early-flowering pompom variety, 2 feet tall; free branching and flowering habit. Flowers double, 1½ inch diameter, of good shape and form, Aureolin (H.C.C. 3). Shown by Mr. H. Shoesmith, Mayford, Woking. See p. li.

Chrysanthemum 'Serenus.' A.M. September 29, 1942, as an early-flowering variety for exhibition. Flower stems stiff, 18-20 inches long, clothed with medium sized dark green foliage. Flowers double, 4 inches across, white; petals stiff, outer reflexed, inner incurved. Shown by Messrs. J. & T. Johnson, Tibshelf, Derbys. See p. li.

Cotoneaster glabrata. A.M. October 6, 1942. A handsome ever-green Chinese species forming a bush 10 to 12 feet high, with spreading, copiously branched growths covered with leathery, dark green, elliptical leaves 2 to 4 inches long. The globose crimson fruits are carried in dense corymbs terminating short leafy shoots. Exhibited by the Director, Royal Botanic Gardens, Kew. See p. liv.

Cypripedium × 'Snow-Bunting.' F.C.C. October 6, 1942. This charming hybrid was obtained by crossing C. 'Florence Spencer' with C. 'F. C. Puddle.' The flower is white, except for some light lemon tinting on the base of the petals and the dorsal sepal. The plant is a free grower and does not inherit the difficult constitution usually associated with the *niveum* section. Raised and exhibited by the Rt. Hon. Lord Aberconway, C.B.E., Bodnant, Tal-y-Cafn, N. Wales. See p. liv.

Early Flowering Chrysanthemum 'August Pink.' A.M. September 15, 1942, as a variety for market purposes. Flower stems long, stiff, clothed with medium-sized foliage. Flowers double, decorative, 4½ inches across, outer petals stiff, a tone of Magnolia Purple (between H.C.C. 030/2 and 030/3), reflexed; inner petals erect, stiff, semi-incurved, of a similar shade to outer, but tips-creamy golden yellow. Shown by Messrs. A. G. Vinten, Ltd., Oldlands Nurseries, Balcombe, Sussex. See p. li.

Eriogonum Alleni. A.M. September 15, 1942. This is one of the most showy of a large North American genus, occurring in Pennsylvania and Virginia, where it grows on steep slopes of weathered shale. It is a deep-rooted perennial forming large clumps, with oblong-ovate basal leaves up to 10 inches long, dark green above and densely covered beneath with brownish wool. The branched inflorescence forms a flattened spray a foot or more across, covered with

numerous small flowers of a bright greenish-yellow colour (H.C.C. 63-64). See p. 1.

Laeliocattleya × 'Derna' var. 'Golden Lady.' A.M. September 15, 1942. An attractive flower of medium size and of light canary-yellow colour, the labellum ruby-crimson. The result of crossing *C. Dowiana aurea* with *Lc.* 'Nugget.' Raised and exhibited by Messrs. Black & Flory, Slough. See p. li.

Laeliocattleya × 'Gwinevere,' Westonbirt var. A.M. September 15, 1942. Flower of large size, purplish-mauve, the expansive labellum crimson-purple with yellow discs on the side lobes. The parents are *Lc.* 'Queen Mary' and *Lc.* 'Gretal.' Raised and exhibited by Messrs. H. G. Alexander, Ltd., Tetbury, Glos. See p. li.

Laeliocattleya × 'Honiton.' A.M. October 6, 1942. The plant bore two large and well-formed flowers of rosy mauve colour, the labellum crimson-purple and with a crisped margin. Raised and exhibited by The Stuart Low Co., Jarvis Brook, Sussex, the parents being *C.* 'Mrs. Frederick Knollys' and *Lc.* 'Crowborough.' See p. liv.

Nerine 'Dunkirk.' A.M. October 6, 1942. A very attractive variety with large flowers borne in umbels of about nine on long scapes. The colour is Mandarin Red (H.C.C. 17/1), and each segment has a middle paler streak of the same colour (H.C.C. 17/2) narrowly marked with a deeper shade (H.C.C. 17). Exhibited by Captain Edmund de Rothschild (gr. Mr. F. Hanger), Exbury, Southampton. See p. liii and Fig. 132.

Nerine 'Edith Amy.' A.M. October 6, 1942. A French Rose (H.C.C. 520) variety having good-sized flowers in umbels of about twelve with a slight streak of light scarlet along the middle of each segment. Exhibited by Captain Edmund de Rothschild. See p. liii.

Nerine 'Herga.' A.M. October 6, 1942. A very distinct and beautiful variety with very large flowers borne in umbels of eight to thirteen on long stout scapes. The colour is Cherry (H.C.C. 722). Exhibited by Captain Edmund de Rothschild. See p. liii.

Protea cynaroides. A.M. October 6, 1942. A South African shrub with stout, sparingly branched stems up to 6 feet high. The leaves are alternate, long-stalked, rounded and of leathery texture. The inflorescence is a globose, terminal head of small, tubular flowers enclosed in an involucre of numerous imbricate coloured bracts. The outermost of these are brown and scale-like, the inner are lanceolate, several inches long, greenish below and rose-pink in the upper part. *P. cynaroides* is figured in the Botanical Magazine at t. 770 (1804) and in many other botanical works. Exhibited by Colonel Stephenson R. Clarke, C.B., Borde Hill, Hayward's Heath. See p. liv.

BOOK REVIEWS.

"A Southern Garden." By Elizabeth Lawrence. 4to. 241 pp. (University of North Carolina and Humphrey Milford, Oxford University Press, London, 1942.) 18s. 6d.

American books on gardening do not always appeal to English readers for various reasons; sometimes because the region described has a climate too distinct from our own to make cultural methods comparable; sometimes, one must admit, because the loose employment of plant names and the over-use of "common" names unfamiliar here prove irritating to the intelligent English amateur. But here is a book to which these strictures do not apply; the climate of the Middle South closely resembles our own so that similarities and differences

in the behaviour of plants become interesting. Then again, though common names are used, ambiguity is avoided by the addition of the Latin names, these in accordance with Bailey's *Hortus Second*. In fact, the *manner* of the book is so acceptable to an English reader that it at once effaces itself and attention is not diverted from the *matter*.

Miss Lawrence is not interested in plants that need much coddling; as she says: "Plants are the material from which the garden is created. I think of a garden not as a manifestation of spring (like an Easter hat), nor as beds of flowers to be cut and brought into the house, but as a place to be in and enjoy every month of the year."

The area covered by the term Middle South includes Virginia, N. Carolina, S. Carolina, Georgia, Alabama and Tennessee; in climate this resembles the south and west of England so that plants given in Bean's *Trees and Shrubs*, or Grey's *Hardy Bulbs* can generally be grown; but the flowering times are apt to vary. At the end of the book is a full list of the flowering dates of many plants and the length of time they remain in flower. There are four main sections to the book: "Two Months of Winter," "Spring Comes in February," "An Introduction to Summer," and "The Climax of Fall."

Miss Lawrence knows her plants and what they will do in her own garden; she also knows what is going on in the gardens of her neighbours and friends, and her horticultural reading is so wide that the names of Jekyll, Bowles, Grey, Darnell and others are scattered through her pages as though they too were personal friends. This book does not depend for its attractions on its illustrations—there are none; but it offers to the English plantsman very pleasant and instructive reading.

"Fruit from the Garden." By J. M. S. Potter. *Growmore Bulletin* No. 7. (H.M. Stationery Office, 1942.) 3d.

This Bulletin is chiefly intended for owners of small gardens who wish to increase their production of fruit; it deals only with the more useful fruits and those which can be counted on to crop quickly. The subject is treated under four headings: What and Where to Grow; How to Manage the Trees and Bushes; How to Pick and Store Crops; Treatment of Old Trees. Just that information that the gardener not thoroughly versed in fruit growing requires is here given in a clear and practical manner which should encourage a more general cultivation of fruit in small gardens.

"Compost for Garden Plot or Thousand-Acre Farm." By F. H. Billington. Sm. 8vo. 88 pp. Illus. (Faber & Faber, London, 1942.) 3s. 6d.

Limitation of the supply of fertilizers, both organic and inorganic, has led an increasing number of people to take an interest in the making of compost from waste material, chiefly of vegetable origin. The desirability of returning this material to the land rather than relying too much on inorganic fertilizers is emphasized by the author, who has practised agriculture in several parts of the world. Clear directions for the building of compost heaps on a large or small scale are given, and some of the improved methods, such as the Indore Process, the "Quick Return" and the Bio-Dynamic methods are described, whilst kindred subjects, such as green manuring, etc., are also touched on. This little book covers the field well.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

OCTOBER 7-8, 1941.

FRUIT AND VEGETABLE SHOW.

Chief Awards in the Competitive Classes for Amateurs.

The Society's Vegetable Challenge Cup, for the highest number of points gained in the competitive classes for vegetables.

To Mrs. H. L. Hansard, Little Bookham. (Gdnr. Mr. J. Wynn.)

The Sutton Vegetable Cup, for the best exhibit of 12 kinds of vegetables.

To Mrs. H. L. Hansard.

The Riddell Trophy, for the best exhibit of 6 kinds of vegetables.

To the Queen Anne's School, Caversham. (Gdnr. Mr. H. J. Goodchild.)

The Affiliated Societies Challenge Cup, for the best exhibit of 18 dishes of apples and pears staged by an Affiliated Society.

To the Reading & District Gardeners' Mutual Improvement Association.

JOINT DAHLIA COMMITTEE.—As there were not sufficient members present to form a quorum the Dahlias submitted were transferred to Floral Committee A for their consideration.

JOINT ROCK-GARDEN PLANT COMMITTEE.—As there were no exhibits the Committee did not meet.

OCTOBER 15, 1941.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Held at Wisley. Mr. D. INGAMILLS in the Chair, and eight other members present.

Awards Recommended:—

Award of Merit.

To 'Evelyn,' as an exhibition variety (votes 8 for, 0 against), raised and shown by Mr. H. Shoesmith, Mayford, Woking. See p. 40.

Selected for Trial at Wisley.

'Evelyn' and 'Winifred,' both from Mr. H. Shoesmith, Mayford, Woking.

Other Exhibits.

'Hilda,' 'Diadem,' 'Cherie' and 'Comet,' all from Mr. H. Shoesmith, Woking.

NOVEMBER 4, 1941.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Rhododendron bug.—Mr. G. F. Wilson showed illustrations demonstrating the attraction of the *Rhododendron* bug by good lighting. Plants and shoots in shade remained free from attack while those exposed to light, particularly on the south and west, were substantially attacked.

Seed found in fireplace.—Dr. Tinckner showed seeds from the same source as those shown at the previous meeting but differing from those originally exhibited and up to the present unidentified.

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FRUIT AND VEGETABLE COMMITTEE.—Mr. A. CHEAL in the Chair, and eleven other members present.

Awards Recommended :

Award of Merit.

To Pear 'Packham's Triumph,' from Messrs. Stuart Low & Co., Bush Hill Park, Enfield.

Other Exhibits.

A collection of vegetables, from Messrs. Allwood Bros., Haywards Heath.

A collection of vegetables, from the Director, R.H.S. Gardens, Wisley.

A collection of seedling Apples, from Mrs. A. Jays, Bella Vista, Four Marks, nr. Alton.

Apples 'Bowden's Seedling' (syn. 'Jonathan'), and 'Woolbrook Pippin,' from R.H.S. Commercial Fruit Trials, Wisley.

Apple 'Henry Wyles,' from Mr. H. J. Wyles, Rodney, Kettering Road, Moulton, Northampton.

FLORAL COMMITTEE A.—Mr. J. B. RIDING in the Chair, and eleven other members present.

Awards Recommended :

Silver Flora Medal.

To Messrs. Sutton & Sons, Ltd., Reading, for an exhibit of Cyclamens.

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver Banksian Medal.

To Messrs. Keith Luxford & Co., Sawbridgeworth, for an exhibit of Chrysanthemums.

To Mr. A. Perry, Enfield, for an exhibit of Penstemons, Schizostylis, and hardy foliage plants.

To Mr. H. Woolman, Birmingham, for an exhibit of Chrysanthemums.

Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations, Chrysanthemums and Gerberas.

To Royal Hospital Gardens (Superintendent, Mr. J. Beezley, N.D.H.), Chelsea, for an exhibit of Chrysanthemums.

Other Exhibits.

Hardy plants from Mrs. K. Hopkinson, Coulsdon.

FLORAL COMMITTEE B.—Mr. E. A. BOWLES, M.A., F.L.S., in the Chair, and fourteen other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of ornamental-foliaged and berried shrubs.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of a rock garden.

Silver Flora Medal.

To Messrs. Hillier & Sons, Winchester, for an exhibit of ornamental-foliaged and berried shrubs.

Silver Banksian Medal.

To Messrs. D. Stewart & Son, Ltd., Ferndown, Dorset, for an exhibit of ornamental-foliaged and berried shrubs.

Flora Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of ornamental-foliaged and berried shrubs.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of ornamental-foliaged and berried shrubs.

Award of Merit.

To *Euonymus Bungeana* as a hardy, ornamental-fruited shrub (votes unanimous), from the Director, R.H.S. Gardens, Wisley. See p. 40.

Other Exhibits.

Crab Apple 'Farrington's Favourite,' exhibited by Mrs. Muspratt, Enfield.

ORCHID COMMITTEE.—Col. STEPHENSON R. CLARKE, C.B., in the Chair, and nine other members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To the Stuart Low Co., Jarvis Brook, Sussex, for a group of Orchids.

Award of Merit.

To *Brassolaeliocattleya* × 'A. Merry' (*Bc.* 'British Queen' × *Lc.* 'Ishtar'), (votes unanimous), from Capt. the Hon. H. R. Broughton, Bakeham House, Englefield Green. See p. 39.

To *Cypripedium* × 'Red Knight' ('Marion' × 'Redstart') (votes unanimous), from Messrs. H. G. Alexander, Ltd., Tetbury, Glos. See p. 40.

To *Laeliocattleya* × 'Snowdrift' (*Lc.* 'Cynthia' × *C.* 'Annette') (votes 6 for, 2 against), from the Stuart Low Co., Jarvis Brook, Sussex. See p. 40.

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMELLS in the Chair, and six other members present.

Awards Recommended :

Award of Merit.

To Carnation 'Spitfire,' for exhibition and market (votes 6 for, 0 against), shown by Mr. F. Hicks, Embrook Nurseries, Wokingham, Berks. See p. 40.

Other Exhibits.

Carnations 'Elizabeth I' and 'Elizabeth II,' from Mr. J. B. Stevenson, Colham Green Nurseries, Hillingdon, Middlx.

THE COMMITTEES AND THEIR WORK.

THE Society is proposing to hold Shows as regularly as circumstances permit ; apart from the opportunity afforded of seeing the plants which nurserymen have to offer, these Meetings are also occasions on which plants of special interest may be brought before the appropriate Committee for their consideration ; the Committees meet on all occasions when a Show is held at the Hall.

The Committees are appointed annually to meet in connexion with the Society's Shows and other activities. Some are nominated entirely by the Council, while others are appointed jointly by the Council and the governing bodies of allied societies. One of the principal objects of these Committees is to encourage the introduction of new species of plants and the production of new and improved varieties of decorative plants, flowers, fruits and vegetables, by examining and reporting upon such as may be submitted either at exhibitions or for trial. Awards are made by the Council to meritorious objects upon the recommendations of these Committees. Another function of the Committees is to collect and disseminate information about plants, flowers, fruits, vegetables and other objects of horticultural interest, including information regarding the classification and nomenclature of garden plants, and the incidence and control of diseases and pests.

In connexion with the submission of new plants to the Committees for certificate or for selection for trial, each plant must be entered with the Secretary of the appropriate Committee, who will say where the plant should be placed. Forms for this purpose may be obtained from the Society's Office before the Committee Meetings, or from the Secretaries of the Committees on the mornings of the Committee Meetings. All plants submitted to the Committees should be named as a means of future identification. If the exhibitor believes that the plant has a name, although it is unknown to him, the words " Name unknown "

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should be written on the entry form in the place provided for the name, and the Committee will then endeavour to identify the plant. If the plant is of garden origin, it should be named by its owner or raiser before it is submitted to the Committee. The names must conform to the Rules of Nomenclature adopted at the International Horticultural Congresses (see R.H.S. JOURNAL 64, p. 40). No award will be made to anything without a name. If the naming is in doubt, the award may be made subject to the verification of the name, and if the proposed name does not conform to the Rules of Nomenclature, any award made will be subject to the alteration of the name. Exhibitors are particularly requested to supply the information required by the entry form, and also any additional particulars which they may think interesting for publication. They will also greatly facilitate the work of the Committees by sending specimens of well-known varieties for comparison.

In considering a new plant it is laid down—(a) that no recommendation for an award to a plant shall be made to the Council unless at least six members vote for it; (b) that no recommendation for a First Class Certificate shall be made unless the number of votes cast in favour of it is at least three times the number cast against it; (c) that no recommendation for any other award shall be made unless the number of votes cast in favour of it is at least double the number recorded against it; and (d) that while the merits of an exhibit shown by a member of the Committee, or in which any member of the Committee is professionally interested, are under discussion, the member concerned must withdraw and not take part in the voting.

Specimens of plants that have received awards or that have been selected for trial will be placed on the New-Plant Stand in the Hall. Exhibitors entering new plants before the Committees must understand before doing so that if the variety is selected for trial, they tacitly agree to send the number of plants or seeds of it required for trial the following year, and that if any award is made, they give their consent to the object being painted or photographed for the Society.

EXHIBITIONS.

THOSE who desire to exhibit at a Meeting at the Halls must give notice in writing to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1, not later than by the first post on the Wednesday before the Meeting at which they wish to exhibit, stating the nature of the proposed exhibit and how much space it will occupy. Entry forms may be obtained from the Secretary and exhibitors are requested to use them. Letters will be sent to exhibitors on the Wednesday before the Meeting saying what space has been allotted. If no letter is received by the Friday before the Meeting, the exhibitor should at once communicate with the Secretary. There are no entry fees, nor are there any charges for space or staging for exhibits of plants, flowers, fruit, vegetables, pictures, plans or models.

Fellows are specially invited to exhibit interesting or well-grown plants, flowers, fruits or vegetables, and any Fellow who desires to stage an exhibit of not more than three pots, vases, or dishes may do so at any Meeting, although he has not applied for space beforehand. Such exhibits must be entered with the clerk at the Small Exhibits Table by noon on the morning of the first day of the Meeting, and he will provide exhibitors' cards and stage the exhibits. Exhibitors are not permitted to place on this special table any notices or leaflets, nor may any orders be booked there. Exhibits staged under this regulation may be considered for Certificates of Cultural Commendation.

The Society's officers will, if necessary, unpack and stage small exhibits if the Secretary has been notified beforehand of their coming and of the owner's inability to accompany them, but the Society does not undertake the responsibility for their repacking or return. All parcels sent by rail or post must be sent carriage paid and at the risk of the sender, addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W. 1. A separate notification must be sent by post at the same time.

EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

REPORT OF THE COUNCIL

FOR THE ONE HUNDRED AND THIRTY-EIGHTH ANNUAL MEETING OF THE SOCIETY, TO BE HELD IN THE LECTURE ROOM OF ITS NEW HALL, GREYCOAT STREET, WESTMINSTER, AT 3 P.M. ON TUESDAY, FEBRUARY 17, 1942.

The Year 1941.—It is satisfactory to be able to report that, in spite of war conditions, the year 1941 has been a more active one for the Society than its immediate predecessor. Whereas in 1940 many of the privileges of the Fellows had of necessity to be substantially curtailed, it has been possible in the year under review to carry on the Society's normal functions with a somewhat greater regularity, although naturally still on a reduced scale.

Shows, commencing with that of February 25, the date of the Annual Meeting, have been held at monthly intervals, excepting in August and December. The Daffodil Show and the Fruit and Vegetable Show also took place.

The Council is grateful for the help of the kindred and specialist Societies who gave additional attraction to the meetings by arranging their competitive classes in co-operation with the Society.

The Shows were well supported by the nurserymen, the competitions were keenly contested by amateur gardeners, and the fact that excellent attendances were recorded shows that the Fellows and Associates, as well as members of the general public, approved the policy of the Society.

While the number of the Society's Fellows has again been reduced by deaths and resignations, it is satisfactory to note that the number of new Fellows elected has been larger than was the case in the previous year and that the net decrease has been a smaller one.

LOSS BY DEATH IN 1941.				ELECTIONS IN 1941.			
Honorary Fellows	..	I		Life Fellows	..	..	5
Associates of Honour	..	4		4 Guinea Fellows..	..	..	4
Life Fellows	..	8		2 " " "	..	..	131
4 Guinea Fellows..	..	I		I " " "	..	..	506
2 " " "	..	163		Associates..	..	..	51
I " " "	..	181		Affiliated Societies	..	..	20
Associates	..	—					<u>717</u>
		<u>358</u>					

LOSS BY RESIGNATION.

4 Guinea Fellows. . .	15
2 " " " " . .	1,166
1 " " " " . .	1,856
Associates . . .	94
Affiliated Societies . .	153
	<u>3284</u>
Less reinstated . .	54
	<u>3,230</u>

Resignations and Deaths	3,588
Elections	<u>717</u>
NET DECREASE . .	2,871

Total on November 12, 1940 29,363

Total on November 4, 1941 26,492

Programme for 1942.—It is hoped to continue the same arrangements as obtained in 1941, and, if conditions permit, to hold a series of Monthly Shows commencing with one on the date of the Annual Meeting, Tuesday, February 17, and continuing until November. In addition, a Daffodil Show and a Fruit and Vegetable Show will be held. Certain competitions will be arranged on the appropriate dates.

The Wisley Gardens will be cared for and kept in the highest state of efficiency that the available labour will allow. Trials of Vegetables, Fruits and Flowers will be continued and the standard collections of herbaceous and other plants will be kept up in consultation with the Joint Committees concerned. In accordance with custom there will be the usual annual distribution of plants and seeds surplus to the requirements of the Gardens.

The Journal and the Society's publications will, subject to the adequacy of paper supplies, continue to appear.

The Lindley Library will remain open and its service of books on loan will be maintained.

It is therefore hoped that the Fellows and Associates will continue to support the Society and so enable the Council to fulfil, in the national interests of Horticulture, the programme that is proposed.

Red Cross Sales.—The accounts of the Society's Red Cross Sales have now been closed and the total amount arising out of the Sales, namely, £7,137 2s. 9d., has been handed over to the Central Fund.

At the request of the Red Cross Society an additional task has been undertaken, namely, the distribution of flower and vegetable seeds and bulbs to our prisoners of war in Germany and Italy. Parcels have been directed to the Camp Leaders for distribution so that all those prisoners who are interested in Horticulture might have an opportunity of sharing in the generous gifts sent to the Society for disposal. It is proposed to continue this work. The gifts of seeds and of bulbs from the members of the Trade and Fellows, as well as contributions towards the expenses, are gratefully acknowledged.

Food Production.—The Panel of Lecturers and Demonstrators has been extended and now numbers 458 in all. Since its inception no fewer than 448 lectures and demonstrations have been held or arranged.

An additional Panel, that of Honorary Garden Advisers, has been set up and placed at the disposal of the County Horticultural Superintendents of the Ministry of Agriculture. Members of this panel are prepared to give advice in the rural areas in the interests of food production. They also, with the Lecturers, advise the troops on the cultivation of their garden plots.

The best thanks of the Society are due to these gardeners, who give up their time voluntarily, and also to their employers for granting them leave to perform these duties.

The collection of lantern slides formed by the Society to illustrate the cultivation of vegetables is in constant use. In addition to this service a series of enlarged photographs (12 sets in all), the subjects of the lantern slides, have been provided with the co-operation of the Ministry of Agriculture. Exhibitions of these photographs, usually of a week's duration at a time, are being held throughout the country. Arrangements have been made for garden advisers to be in attendance at the exhibitions to answer questions. A full programme of further such exhibitions has been arranged for the coming year.

At Wisley a series of films especially designed for instructional and propaganda purposes has been taken under the direction of the Society's staff. These films are issued by the Ministry of Information.

The Society's cultural pamphlets have been kept up to date, and there has been published "The Vegetable Garden displayed," a booklet on the cultivation of vegetables, simply written and fully illustrated. The first impression of twenty-five thousand copies was immediately sold out and the second impression of a similar number has been equally successful; arrangements have been made for further reprints to meet the continued demand.

The Knightian Medal was again offered to Affiliated Societies for the best cultivated vegetable plot in each group and 126 Medals have been granted.

Wisley: The Gardens.—As might be expected, war conditions and the difficulties of travelling have reduced the numbers of Fellows and their friends who visited Wisley in 1941, yet during the fine weather many signed the Visitors' Book.

Plant Collections.—These are being maintained and added to as opportunity allows.

Vegetable and Flower Trials.—The Vegetable Trials have this year attracted more than the usual number of visitors, who showed much interest in the trials of Onions, outdoor Tomatos, Carrots, and Turnips, and in other vegetables which were grown in large variety. The specimen allotment plot brought many enquiries.

The permanent trials, such as Delphinium, Lupin, Border Carnation, Gladiolus and Dahlia, proved a source of attraction to those who found it possible to pay the Gardens a visit.

Battleston Hill.—Additional Rhododendrons, Azaleas and trees and shrubs of other suitable genera have been planted and excellent growth has been made by the established plants, which give promise of flowering well in 1942.

Demonstrations of Practical Garden Operations.—During 1941 twelve demonstrations were carried out at Wisley for the benefit of Fellows and their friends. The demonstrations were generally well attended.

Army Agricultural Scheme, Gardening Course.—Under this scheme a course of lectures and practical demonstrations on the cultivation of vegetables has been given to a number of army officers.

School of Horticulture.—Almost all the student gardeners who were working at Wisley are now serving with H.M. Forces and they have been replaced by younger boys. The courses of instruction given during the year were modified to meet the requirements of those under instruction.

During the year the Society's examinations for the National Diploma were carried out at Wisley.

Advisory Services.—The advisory services offered to Fellows have been widely used and the number of enquiries made concerning the growth of vegetable crops, their pests and diseases, has been very large.

Co-operation with various allotment societies and other growers has been a feature of the advisory work this year and members of the staff have visited many allotments in the London County Council area and also in the surrounding counties.

Close co-operation has been maintained with the Advisory Services of the Ministry of Agriculture.

Commercial Fruit Trials.—The Society has continued, in co-operation with the Ministry of Agriculture, the trials of hardy fruits, which occupy about 42 acres. The spring frosts seriously damaged the crops of Plums, Gooseberries and Black Currants, but an average yield was obtained from Apples, Pears, Strawberries and Raspberries. New varieties have been planted for trial purposes, and others have been added to the standard collections. Numerous visitors have visited the trial grounds and there has been a considerable increase here also in advisory work. Pollination experiments in the Orchard House are in progress and the recording of the vegetative characters of all kinds of fruit is, as far as possible, being continued.

The Wisley Laboratories.—In the cause of Physiological research a further series of tests has been made of various chemicals designed to inhibit the growth of vegetables in storage with the object of prolonging the possible storage period of food products. Several problems have been submitted by the Ministry of Agriculture for investigation, and work on these has been carried on in co-operation with the Ministry and the Imperial College of Science.

The Entomological Research carried out during the year has been concerned with the following topics :

1. Parasites of the Greenhouse Mealy Bug.
2. The efficacy of poison baits against wireworms.
3. The effect of early and late sowings and planting of Onions on the incidence of attack by the Onion Fly.
4. The effect of quick- and slow-acting insecticides upon viviparous aphides.
5. The Narcissus Fly.
6. The stem and bulb eelworm in Onions and Leeks.

Mycological Research.—The breeding and selection of *Antirrhinum* varieties for complete resistance to rust has been continued. Considerable improvement in flower character and colour was evident this season.

The investigation of the value of winter treatments for control of Rose Black Spot continues. Preliminary experiments on the control of Lilac Blight have been carried out.

At the request of the Plant Pathological Committee of the British Mycological Society, a census has been taken of the prevalence of virus diseases of Potato, and of the occurrence of Potato Blight in the Wisley area.

Medicinal Plants.—Collections of medicinal plants and their seeds and leaves have been made and sent for investigation.

Vitamins.—Plant products have been sent to Laboratories concerned with human nutrition for the estimation of vitamin content.

Photography.—Large numbers of lantern slides illustrating the cultivation of vegetables have been prepared for the Society's collection, the illustrations in the publication "The Vegetable Garden displayed" being from Wisley photographs. A further series is being made to illustrate the cultivation of fruit.

White Fly Parasite.—The distribution of the White Fly Parasite has been carried out as usual during the year.

The Society's Examinations.—The Society's Examinations have been held and the National Diploma in Horticulture has been awarded to 11 candidates. Twenty-three candidates passed the Preliminary Examination.

Certificates were awarded to 99 senior and 86 junior candidates in the General Examination.

In the Teachers' Preliminary Examinations in School and Cottage Gardening 105 candidates were successful, 13 passing the Advanced Section.

The examinations will be held again in 1942.

The Society's Publications.—Apart from the special publications already referred to, the JOURNAL and Curtis's Botanical Magazine have

been regularly issued. The second volume of the Horticultural Colour Chart, which completes this work, has now been published and the Monograph on the Genus *Paeonia* by Major Stern is in the press. The R.H.S. Gardeners' Diary has appeared as usual.

Obituary.—It is with great regret that the deaths of a number of distinguished horticulturists and supporters of the Society have to be recorded. Among these are Sir Arthur Hill, V.M.H., Director of the Royal Botanic Gardens, Kew, a past Member of Council and Editor of Curtis's Botanical Magazine : as a member of many committees his advice on all scientific and technical matters will be sadly missed ; Mr. W. E. Wallace, V.M.H., the well-known raiser and grower of Carnations ; Mr. W. Bennett, Mr. W. A. Jenkins, Mr. W. J. Pritchard, Mr. G. Taylor and Mr. J. G. Woodward from among the Associates of Honour ; Lady Rockley, one of our leading amateur gardeners ; Mr. J. W. Odell, a member of the Society's Scientific Committee ; Mr. C. Engelmann, the carnation grower and exhibitor ; and Mr. H. Dixon, the orchid grower and exhibitor.

The Victoria Medal of Honour.—The Victoria Medal of Honour has been awarded to Mr. E. L. Hillier for his work in the introduction of new and rare plants.

The Associates of Honour.—The Associateship of Honour has been awarded to Mr. W. D. Besant, Director of Parks and Botanic Gardens, Glasgow ; Mr. G. F. Hallett, head gardener at Lilford Hall ; Mr. F. Streeter, head gardener at Petworth Park ; and Mr. H. Windibank, head gardener at Frensham Hall.

The Veitch Memorial Medals.—Awards have been made as follows : A Gold Medal to Mr. B. Y. Morrison of Washington, for his work for horticulture both in America and this country ; a Gold Medal to Mr. R. F. Wilson, for his work in connection with the Horticultural Colour Chart ; a Silver Medal and £25 to Mrs. Malby, for her photographic work on garden subjects ; and a Silver Medal to Mr. W. H. Divers, V.M.H., in recognition of his fifty years of service on the Society's Fruit and Vegetable Committee.

The Loder Rhododendron Cup.—The Loder Rhododendron Cup has been awarded to Dr. J. Macqueen Cowan for his work on the botany of the Rhododendron.

Annual Medals.—It has been decided to withhold the awards of the Lawrence, Holford, Sander, George Moore and Williams Memorial Medals and of the Reginald Cory Memorial Cup until after the war.

Gifts to the Society.—The Council desires to express its cordial thanks to the numerous Fellows and friends of the Society for gifts of plants, seeds and books. The gift of two portraits and a medallion of Andrew Knight, past President of the Society, from Mrs. Bromley-Martin, and a collection of Tulips from Sir Daniel Hall are acknowledged with special gratitude.

Council.—The Council wishes to express the Society's thanks for, and appreciation of, the invaluable services rendered by its retiring members: Mr. T. Hay, C.V.O., V.M.H., Mr. G. W. Leak, V.M.H., and Mr. C. T. Musgrave, V.M.H.

The Press.—The Council desires to record its warm appreciation of the help rendered to the Society by the Press, given with never-failing goodwill.

Committees, Judges and Examiners.—The Council most cordially thanks the members of the various Committees and the Judges and the Examiners who, in spite of travelling and other difficulties, have so readily given their time to the work of the Society.

Staff.—The claims of military or national service have substantially reduced the Society's staff. In addition to 37 from Wisley, 12 have left the administrative staff at Vincent Square. The best wishes of the Council follow them in their various activities and it is hoped that after the close of hostilities they may again resume their duties with the Society.

The Council wishes to thank the Secretary and his staff at Vincent Square and the Director and his staff at Wisley for the most material assistance they have given to the task of carrying on successfully the Society's work.

Signed on behalf of the Council,
ABERCONWAY,
President.

December 31, 1941.

Dr.

ANNUAL REVENUE & EXPENDITURE ACCOUNT

To LONDON—	£	s.	d.	£	s.	d.
ESTABLISHMENT EXPENSES LESS ALLOCATIONS—						
Rent, Rates and Taxes	3,350	2	2			
Salaries and Wages	8,131	6	10			
Other Establishment Expenses, including Light, Fuel, Stationery, Professional Fees, and Renewals	3,763	16	3			
				15,245	5	3
„ WISLEY—						
Net Expenditure for Year, as per separate Account				12,991	11	1
„ PRINTING AND POSTAGE OF JOURNAL AND OTHER PUBLICATIONS	9,509	17	0			
Less Sales and Advertisements	3,170	3	7			*
				6,339	13	5
„ STAFF PENSIONS	1,196	10	0			
Less Contributions by Staff as per Scheme	575	8	1			
				621	1	11
„ MEETINGS—						
Expenses, Labour and Overheads of Special and other Meetings	1,684	0	2			
Less Receipts	259	18	6			
				1,424	1	8
„ CUPS AND MEDALS				42	0	2
„ GARDEN INSPECTIONS—						
Expenditure less Receipts				18	17	6
„ CONTRIBUTIONS TO LINDLEY LIBRARY, as per Trust Account—						
Purchase of Books	152	2	4			
Salaries, etc.	613	6	11			
				765	9	3
„ SPECIAL EXPENDITURE—						
Donations, Gardeners' Royal Benevolent Inst.	52	10	0			
„ Royal Gardeners' Orphan Fund	21	0	0			
„ British Growers' Publicity Council	26	5	0			
„ British Colour Council	5	5	0			
„ Royal Geographical Society	10	0	0			
„ Women's Farm and Garden Assn.	105	0	0			
Red Cross Sale—Balance of Expenses	48	9	0			
Photographs and Slides (Vegetables)	336	15	6			
Air Raid Precautions	339	18	9			
				945	3	3
„ BOTANICAL MAGAZINE	791	1	4			
Add Work in Advance	86	0	0			
				877	1	4
„ EXAMINATIONS IN HORTICULTURE—						
Expenses	358	1	0			
Less Fees	263	14	0			
				94	7	0
„ GENERAL SCHOLARSHIPS	57	13	4			
Less Contribution from Knott Scholarship Fund	10	0	0			
				47	13	4
„ OLD AND NEW HALLS SINKING FUND APPROPRIATION				3,366	0	0
„ RESTAURANTS—						
Proportion of Overhead Expenses				719	18	5
				<u>£43,498</u>	<u>3</u>	<u>7</u>

FOR THE YEAR ENDED 31st DECEMBER, 1941.

Cr.

	£	s.	d.	£	s.	d.
By ANNUAL SUBSCRIPTIONS AND DONATIONS				35,809	13	3
„ DIVIDENDS AND INTEREST	1,600	16	7			
„ Do. Do. DAVIS TRUST	43	11	2			
„ DEPOSIT INTEREST	142	2	2			
				1,786	9	11
„ HALL LETTINGS, Gross				575	18	6
„ LIFE COMPOSITIONS— Being amounts paid by Fellows who have died during the year				194	5	0
„ RENT OF FREEHOLD PROPERTY (Wisley)				346	13	11
„ BALANCE, being Excess of Expenditure over Revenue charged against General Reserve				4,785	3	0

43,498 3 7

LIABILITIES.

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position of the Society on the 31st December, 1941. In the total of Assets, £336,783 10s. 3d., are included Investments and Cash amounting in all to a total sum of £58,668 7s. 0d., representing Depreciation and other Funds.

BALANCE SHEET, 31st DECEMBER, 1941.

ASSETS.

	£	s.	d.	£	s.	d.
OLD HALL, OFFICES, RESTAURANT, LIBRARY, AND EQUIPMENT AT COST	77,642	0	0			
NEW HALL, RESTAURANT AND EQUIPMENT AT COST	167,706	2	10			
	245,348	2	10			
Less Old and New Halls Sinking Fund <i>per contra</i>	39,006	10	9			
				206,341	12	1
OLD AND NEW HALLS SINKING FUND INVESTMENTS AT COST—						
As at 31st December, 1940	34,596	1	8			
Additions during the year	4,332	5	5			
Cash awaiting Investment	78	3	8			
				39,006	10	9
(Market Value of Investments at 31st December, 1941, £39,284 17s. 2d.)						
FREEHOLD PROPERTY, WISLEY—						
At Cost, less amounts written off				13,105	2	11
BOTANICAL MAGAZINE—						
Stock				100	0	0
DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST				10,000	0	0
(Market Value at 31st December, 1941, £10,340 19s. 3d.)						
SHOWS CONTINGENCY FUND INVESTMENTS AT COST—						
As at 31st December, 1940	3,161	18	2			
Additions during the year	85	1	1			
				3,246	19	3
(Market Value at 31st December, 1941, £3,266 17s. 3d.)						
SUPPLEMENTARY PENSION FUND INVESTMENTS AT COST—						
As at 31st December, 1940	5,457	16	7			
Additions during the year	451	6	11			
				5,909	3	6
(Market Value at 31st December, 1941, £6,008 16s. 0d.)						
DAME JULIA M. TILDEN LEGACY INVESTMENT AT COST				500	0	0
(Market Value at 31st December, 1941, £527 6s. 1d.)						
MRS. A. C. CHARRINGTON LEGACY INVESTMENT AT COST				500	0	0
(Market Value at 31st December, 1941, £506 5s. 6d.)						
GENERAL INVESTMENTS AT COST				48,112	4	6
(Market Value at 31st December, 1941, £48,642 13s. 4d.)						
WISLEY ADJUSTMENT ACCOUNT				662	5	2
R.H.S. DICTIONARY OF GARDENING—						
Expenditure to date (in suspense)				904	15	2
SUNDRY DEBTORS AND PAYMENTS IN ADVANCE				7,707	9	9
CASH AT BANK AND IN HAND				687	7	2
				<u>£336,783</u>	<u>10</u>	<u>3</u>

J. S. FEATHER, F.C.A., Auditor
(HARPER, FEATHER & PATERSON, Chartered Accountants),
4 Lloyds Avenue, London, E.C. 3

6th January, 1942.

Dr.

WISLEY GARDENS—REVENUE & EXPENDITURE

	£	s.	d.	£	s.	d.
To ESTABLISHMENT EXPENSES—						
Salaries and Wages	2,578	0	9			
Rates, Taxes and Insurances	487	1	9			
Miscellaneous, including Donations	973	11	3			
Annuities	143	0	0			
				4,181	13	9
„ LABORATORY AND SCHOOL OF HORTICULTURE—						
Salaries and Wages	2,654	5	4			
Miscellaneous	99	16	3			
Depreciation	49	9	6			
				2,803	11	1
„ GARDEN—						
Salaries and Wages	6,610	10	10			
Plant Distribution <i>less</i> Receipts	275	7	6			
Miscellaneous	1,092	16	4			
Depreciation	300	5	5			
				8,279	0	1
STAFF PENSIONS	487	9	7			
<i>Less</i> Contributions by Staff, as per Scheme.	243	15	0			
				243	14	7
				£15,507	19	6
To BALANCE, brought down				12,241	11	1
„ SPECIAL EXPENDITURE—						
Installation of Spraying Facilities in Fruit and Vegetable Trial Grounds				750	0	0
				£12,991	11	1

ACCOUNT FOR THE YEAR ENDED 31st DECEMBER, 1941. Cr.

	£	s.	d.	£	s.	d.
By DIVIDENDS AND INTEREST				996	4	3

„ CONTRIBUTIONS TO FRUIT TRIALS, 1940-41—

Ministry of Agriculture	300	0	0			
Worshipful Company of Fruiterers	26	5	0			
National Farmers' Union	14	1	0			
					340	6 0

„ GARDEN—

Sales and Miscellaneous Receipts				1,929	18	2
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„ BALANCE, carried down				12,241	11	1
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£15,507 19 6

„ BALANCE, being Net Expenditure for the Year,
carried to the Annual Revenue and
Expenditure Account

12,991 11 1

£12,991 11 1

-WISLEY GARDENS—BALANCE

LIABILITIES.

	<i>£</i>	<i>s.</i>	<i>d.</i>
ACCUMULATED FUNDS ACCOUNT	35,870	7	8
VINCENT SQUARE ADJUSTMENT ACCOUNT	662	5	2
ENDOWMENT TRUST FUND.	24,479	14	3
DEPRECIATION AND RENEWALS FUND.	9,935	7	0

£70,947 14 1

SHEET, 31st DECEMBER, 1941.

ASSETS.

	£	s.	d.	£	s.	d.
LABORATORY, DWELLING HOUSES, GLASS HOUSES, RANGES, ETC., AT COST				33,371	10	10
N.B.—The Hanbury Trust Estate is, under the Trust Deed, vested in the Society only so long as it is in a position to use it as an Experimental Garden. Accordingly the Expenditure thereon by the Society is an Asset only so long as the Gardens continue to be used by the Society.						
FUEL STOCK (valued by the Director)				390	9	8
PLANT AND LOOSE EFFECTS (valued by the Director)—						
As at 31st December, 1940	1,716	15	3			
Add Purchases during the year		14	2	9		
				1,730	18	0
Less Depreciation of Garden and Laboratory Effects		99	14	11		
				1,631	3	1
LIBRARY—						
As at 31st December, 1940	1,066	15	1			
Additions during the year		72	14	2		
				1,139	9	3
ENDOWMENT TRUST FUND INVESTMENTS AT COST				24,479	14	3
(Market Value at 31st December, 1941, £23,980 19s. 8d.)						
DEPRECIATION AND RENEWALS FUND INVESTMENTS AT COST—						
As at 31st December, 1940	9,685	7	0			
Additions during the year		250	0	0		
				9,935	7	0
(Market Value at 31st December, 1941, £11,197 6s. 4d.)						
				£70,947	14	1

I have audited the books from which the foregoing Accounts are compiled, and certify that they exhibit a true and correct statement of the position on the 31st December, 1941. In the total of Assets, £70,947 14s. 1d., are included Investments, amounting to £34,415 15s. 3d., representing Endowment and Depreciation Funds which are not available for the general purposes of the Society.

J. S. FEATHER, F.C.A., Auditor
(HARPER, FEATHER & PATERSON, Chartered Accountants),
4 Lloyds Avenue, London, E.C. 3.

6th January, 1942.

ROYAL HORTICULTURAL SOCIETY—TRUST FUND ACCOUNTS, 31st DECEMBER, 1941.

	Amount of Fund represented by Investments at Cost and Cash.		Income Balance in hand 31st Dec., 1940.		Income received during 1941.		Expenditure in 1941 in accordance with the Trust.		Income Balance in hand 31st Dec., 1941.		(a) Investment		(b) Balance of Cory Bequest at 31st Dec., 1940		(c) Includes contribution by the Society in 1941.		(d) Income added to Fund and re-invested.	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
1. ALFRED DAVIS TRUST FUND	1,049	9 2			43	11 2	8	17 9										
2. WILLIAMS MEMORIAL FUND	258	15 4	13	0 3					21	18 0	Cost of books purchased by the Society up to 31st Dec., 1940.	1,599	10 2					
3. MASTERS MEMORIAL FUND	542	17 0	112	16 2					132	16 2								
4. NICHOLSON MEMORIAL FUND	202	2 2																
5. SCHRÖDER PENSION FUND	557	14 6	6	6 8			5	4 0			Books purchased by the Society in 1941.	13,764	1 9					
6. LINDLEY LIBRARY TRUST	15,425	14 3 (a)																
7. SIR JAMES KNOTT TRUST	600	0 0			660	3 7 (c)												
8. VETCH MEMORIAL TRUST FUND	1,746	1 0	82	18 3	25	3 0	65	17 0	98	1 3								
9. MOORE MEDAL TRUST	190	10 6	7	15 5	7	16 6			15	11 11								
10. SEWELL MEDAL TRUST FUND	531	8 9	23	13 7	23	8 11	1	17 0	45	5 6								
11. MRS. SHERMAN HOYT PRIZE FUND	207	7 10	44	8 11	10	8 1	10	0 0	44	17 0								
12. LORD RIDDELL TROPHY FUND	222	12 11	11	19 4	5	19 0	7	12 6	10	5 10								
13. DEDICATIONS VOLUME FUND (Botanical Magazine)	243	10 11			10	5 7	10	5 7 (d)										
14. THE COLMAN FUND	1,315	17 2			34	11 2	34	11 2 (d)										
15. P. D. WILLIAMS FUND	372	7 9	28	2 6	10	19 5	3	4 8	35	17 3	Less books purchased in 1941	56	8 3					
16. THE GLAZEBROOK FUND	100	0 0	9	2 1	3	6 3			12	8 4	Balance at 31st Dec., 1941.	£668	5 11					
17. CORY BEQUEST TO LINDLEY LIBRARY	668	5 11 (b)			23	0 5	23	0 5 (d)										
	Total as per Balance Sheet		£505 13 6															

Notes on above Funds:

1. Bequeathed to the Society in 1870 for annual prizes or any other object the Council may determine.
2. Raised by donations in 1891 in memory of the late Mr. R. S. Williams towards the provision of prizes and medals.
3. Raised by donations in 1908 in memory of the late Dr. Masters towards the provision of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the bequest of the late Mr. G. R. Moore to provide a memorial annually for the best new Cypripedium shown to the Society in 1923 as a donation and fund for the purchase of further books.
4. Raised by donations in 1911 to provide a trophy annually to publications.
5. Provided by the Society in memory of the late Baron Schröder to the late Mr. J. J. Sewell to provide prizes for the improvement of the Society's show.
6. The Lindley Collection is the fine collection of books and pamphlets which belonged to the late Dr. Lindley. It has since been added to by the bequest of the late Mr. G. R. Moore to provide a memorial annually for the best new Cypripedium shown to the Society in 1923 as a donation and fund for the purchase of further books.
7. Presented to the Society in 1920 by the late Sir James Knott for the purpose of providing a scholarship tenable at Wisley Garden.
8. Presented to the Society in 1922.
9. Presented to the Society in 1925 by the late Mr. A. J. Sewell to provide medals for the improvement of the Society's show.
10. Presented to the Society in 1925 by the late Mr. A. J. Sewell to provide medals for the improvement of the Society's show.
11. Presented by Mrs. A. Sherman Hoyt in 1923 as a donation and fund for the purchase of further books.
12. Presented to the Society in 1923 by the late Mr. P. D. Williams and to encourage the improvement of the Society's show.
13. Presented to the Society in 1925 by the late Mr. H. de T. Glazebrook to provide medals for the improvement of the Society's show.
14. Presented to the Society in 1925 by the late Mr. H. de T. Glazebrook to provide medals for the improvement of the Society's show.
15. Raised in 1936 by donations to commemorate the late Mr. P. D. Williams and to encourage the improvement of the Society's show.
16. Bequeathed to the Society in 1938 by the late Mr. H. de T. Glazebrook to provide medals for the improvement of the Society's show.
17. Proceeds of the sale of the Cory Bequest to the Lindley Library (referred to under No. 6), held, in cash for the time being, in trust by the Society for the purchase of further books.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

ANNUAL GENERAL MEETING.

FEBRUARY 17, 1942.

REPORT OF PROCEEDINGS at the ONE HUNDRED AND THIRTY-EIGHTH ANNUAL GENERAL MEETING, held on Tuesday, February 17, 1942, in the Lecture Hall, Greycoat Street, London, S.W. 1.

The Lord ABERCONWAY, C.B.E., V.M.H., President, in the Chair, with Members of Council and about two hundred Fellows.

The SECRETARY read the notice convening the Meeting and announced that the Minutes of the Annual Meeting for the year 1941 had been circulated in the JOURNAL, Vol. 66, Part 4.

The PRESIDENT: I beg to move that the Minutes be taken as read; I take it you will agree to that.

The Meeting agreed and the Minutes were signed by the President.

The PRESIDENT: I now beg to move

THAT the Report of the Council be and is hereby adopted.

Long before I reached the years of discretion I perforce acquired the knowledge that Cæsar divided Gaul into three parts, and those of you who have done me the honour to listen to my remarks at these successive annual meetings—and I believe that this is the eleventh—will know that for the purposes of my argument I have divided the activities of the Society also into three parts.

These activities comprise: our Shows, our publications, and with these I class our Library, and lastly and thirdly, our Wisley. It is these three activities which justify our existence as a Society, and as I am proud to call it, a learned Society, for the term "learned Society" denotes research, enlightenment and progress. These three things, though primarily of course for the benefit of our Fellows, gradually make their way to the advantage of a still wider circle, and no one who takes an interest in our proceedings can fail sooner or later, and usually sooner, to hear something to his advantage.

Now we are during these last two years rapidly developing a fourth activity: Cæsar dealt with Gaul and the Society is doing what it can to deal with Germany. We are helping people as far as lies in our humble power to make the country more self-supporting. Take our

publications ; we are nowadays, of course, short of paper for our printing. There is a very rigorous control of the supply of that article, and we have reluctantly come to the conclusion that we ought to drop the usual Daffodil and Lily Year Books, which I know our Fellows appreciate, and devote some of the paper that we used in these, with additional paper of course which we get for the purpose, to our publication entitled "The Vegetable Garden Displayed." That has been the Society's best seller in its whole history ; we have sold already 125,000 copies, and we are now negotiating for paper for a further 50,000. The publication is designed by means of photographic illustrations to show the novice in vegetable culture—and there are a great many novices growing vegetables to-day—all the little ways and devices of a skilled craftsman, and old gardeners are very skilled craftsmen. If you watch an old and experienced gardener sow seeds, do trenching, or dig a hole, you will notice how he does the maximum of work with the minimum of effort, and that is what we want to try to teach the novice. I think the very large demand for this particular publication shows that we have been successful.

That best seller has been devised and produced entirely by our staff, and I think it is very greatly to their credit that they have done so. The Council has confined its part of the work to encouragement and to finance—although I do remember that we had at one Council Meeting an extremely heated argument as to which was the best way to hold a spade.

We hope to follow this publication a little later on by a similar one entitled "The Fruit Garden Displayed," but that is not so urgent for the war effort, so we did the vegetable one first.

Besides that we have prepared a very great number of slides at Wisley for lectures. We prepared a large number of photographs, based on those taken for the publication I have mentioned, in sets which we send round for exhibition, and we have now entered in a small way the film industry, because we are helping the Board of Agriculture in the preparation of a film dealing with methods of cultivation.

Then there is our JOURNAL ; that is smaller than it used to be again because of the Paper Controller, but after all, it is still there and it still appears monthly. It is full of good matter, as I think you will agree, about vegetables. You will read in it that cabbages have many diseases, and that is very pleasant for one who, like myself, does not like cabbages ; you will read that some of these diseases are quite incurable, so that you are not hindering the war effort if, when the spots appear, you root up that succulent vegetable and feed it to the cat. But the articles, take them all round, are useful and well done. I also, like many of you, look forward to the time when perhaps vegetables are grown, as they were in peace time, by the market gardener and his staff, and when vegetables are mentioned in such a publication you get recipes for cooking them in a delicious manner—the kind of old-fashioned recipe that says "Take four eggs, half a pound

of butter and the juice of six lemons"—the time for that kind of thing is not yet. I should like to see articles about crocuses and carnations instead of articles about cabbages, but for the moment the cabbage and its kindred is the right thing.

Then there are our Shows. Now our Shows are and have been a great difficulty. In a christening the great thing is to have a baby, and it is very much better if the baby is thriving and ornamental. In a Show you must have exhibits, and it is very much better if those exhibits are thriving and ornamental. The present scarcity of labour, both for growing and packing, the scarcity of coal for bringing things on in heat, and the fact that transport is extremely hard to come by, makes exhibiting very difficult indeed for the trade and practically impossible for the amateur. Therefore, our Shows perforce have to be monthly and not fortnightly. But I would put this to you: even if our exhibits are fewer and smaller, at these monthly meetings it is my experience that we meet even more friends than we did in pre-war times, and above all, we meet keen gardening ones—what I call the worth-while friends. In the Society's old records these periodical occasions were called "Meetings" and not "Shows," and I commend that word to you. If a Show be smaller and yet the meeting of one's friends is still there, I think one counts it not amiss.

There is one more war activity I must mention. We are holding in aid of the Red Cross, that always most deserving object, a postal auction sale, as you will doubtless all of you have heard. Garden requisites have been generously given, chiefly by manufacturers; books and articles of sport have come in from our Fellows and their many friends; His Majesty the King has sent a book of value from his own library; we have had a most generous response, and we owe the donors all our thanks for what they have done. The catalogue we had hoped would have been out on the occasion of this meeting, but the books have taken rather longer to catalogue than we had supposed, and it will be published, we trust, at the end of this month. I hope you will all get a copy, and that the bidders will be as generous as the donors.

So much for some of our activities, but after all, the life-blood of our Society is our Fellowship. Our Fellows have not received from the Society as much perhaps as they could wish, certainly not as much as they received before the war, nor have the Council been able to give them as much as their loyalty has merited; but if you think of it, all amenities are to-day perforce cut down. A man's house is no longer his castle; the breakfast egg has practically gone; sugar, and now even soap, are shadows of their former selves, and in these circumstances, if you think it over, it is really remarkable how many pre-war amenities the Society still provides for its Fellows. Perhaps it was due to this that last year the resignations, which have been an ever-present anxiety to us since the beginning of the war, were less than the resignations of the year before by no less a figure than 4,000. New Fellows, on the other hand, this last year were more than they

were in the previous year, and since the closing of our books in November the number of new Fellows up to date has been 314, which is substantially above what the figure was for the corresponding period last year. But although the resignations have been less and new Fellows have been more, the new Fellows still do not balance the resignations, and always death takes toll of our Fellowship. We have lost in the last few weeks very heavily ; the DUKE OF CONNAUGHT, a very distinguished patron and one who always took a great interest in the Society, as we all know, has died ; we have also lost in the last few weeks four very great gardeners, Sir ARTHUR HILL, who did so much for Kew, ex-member of the Council, Editor of our Botanical Magazine ; Sir JEREMIAH COLMAN, Chairman of our Orchid Committee, himself the owner of a great and most interesting collection of Orchids to which he had devoted much of his life, and a wise and tactful head of that Committee ; LIONEL DE ROTHSCHILD, who knew everything there was to be known about Rhododendrons and was the very embodiment of energy and progress ; also ARTHUR GROVE, known all over the world where there are gardeners who speak English, as the " Lily man." All four were friends of many whom I see here in this room, and I know that their memories will flourish with us as did the plants they loved and grew so well.

We have other changes. On the Council we lose, temporarily only I hope, Mr. LEAK and Mr. HAY, experts in their knowledge, sound in their judgment. The third retiring member is Mr. MUSGRAVE. None of us, members of Council, can think of the Royal Horticultural Society Council without Mr. MUSGRAVE, and I am sure you here will echo what I may call our slogan " MUSGRAVE must stay," and that you will approve our exercise of the power that is reserved to us to prescribe that in the case of one of the three retiring members a year shall not elapse before he is eligible for re-election. To replace the other two members we are proposing, and there is no alternative nomination, first, Mr. TROTTER, who has deputized as Treasurer for the past few weeks in place of Mr. MONRO who I am glad to think is with us again to-day, and most rapidly convalescing. As Mr. TROTTER was deputizing for him at the time the Accounts were made up, it has been arranged by Mr. MONRO that Mr. TROTTER shall make the usual statement on finance. We are very glad that Mr. TROTTER is able to rejoin us ; you will remember he left the Council to take up certain work in the City. Now he has been asked to take up further responsible work and give more time to his Bank, therefore he is able to give more time to the work of the Royal Horticultural Society's Council ; I know it is rather puzzling, but I am sure you understand just how it works.

The second additional member of the Council is Mr. INGAMILLS, a man of very great standing in the horticultural trade who will bring a specialized and very valuable knowledge to the work of our Council.

In conclusion, I would like to express the very cordial thanks of the Council, and I am sure of the Fellows also, to the many who have

helped us during the past months. The shortage of paper has not hampered the kindness that the Press have always displayed towards our activities; the shortage of trains and the demands on their time for business of a public nature has not diminished either the attendances or the enthusiasm of our voluntary helpers, our Committeemen, our judges, our lecturers, our writers, our exhibitors, and we have a special sympathy for the last-named, for all have given of their best. The room of Floral Committee B was packed to the last chair to-day and they gazed in true war-time style on the very meagre fare put before them—they usually get one dish and some rather doubtful hors-d'œuvres—I refer of course to the flowers, because, as you know, the Royal Horticultural Society gives its Committees work, but never, never gives them lunch.

Then there is our staff; each one of them has been doing, it almost seems to me, the work of two, they have been doing it ungrudgingly and very well indeed. In all concerns these are hard days for the staff.

To all these helpers the Society owes much gratitude indeed. Without them the Society would be a poor thing, with their help I am convinced the Society can ride successfully the stormiest of seas.

I will call on Mr. TROTTER to make his statement and to second the motion I have made.

Mr. R. D. TROTTER: You have heard from our President an interesting account of the year's work of the Society. Our Treasurer, Mr. GEORGE MONRO, whom we are glad to see here again after his long illness, has asked me to undertake the Report on the finances of the Society, an office which I gladly undertake, having acted as his deputy for the past few months. You have already heard from the President how it is that I am able to get away from the City.

The Accounts have been circulated in the February number of the JOURNAL and should be in your possession. We have with us the Society's Auditors who are prepared to answer any question, the answer to which should appropriately come from them.

Now as regards the Accounts themselves, will you take the expenditure side?

The establishment expenses show no* appreciable increase, the economies effected almost balancing the increases due to taxes, rates, war bonus, etc. Wisley has cost £550 less. There has been some saving on salaries and wages due to the smaller staff, but the rate of pay there has risen as it has everywhere else. Sales of fruit and vegetables were £600 better, but labour-saving devices, such as spraying apparatus and a new tractor, have offset these.

Publication expenses show a large increase; this is not due to the JOURNAL but, as the President has told you, to the publication of "The Vegetable Garden Displayed." The actual cost of the publications of the Society, however, remains about the same; the revenue more than balancing the increased expenditure.

The Society's meetings, although more in number than in the previous year, have cost less. The gate receipts show an increase which demonstrates that the public has taken an increasing interest in the Society's doings which must always in the long run be of lasting benefit to the Society.

Special expenditure shows an appreciable reduction of £1,277 due largely to the completion of the Pritzel Revision—which used to be called the Index Londinensis—and the Monograph Genus Tulipa; we have undertaken no other new publications.

As a result the total expenditure for the year is £43,498 as against £45,107 in 1940.

Now we come to the Revenue side of the accounts.

The annual subscriptions and donations—I want to say a word about the latter, donations. Our thanks are very much due to a number of Fellows who, wishing to keep up their association with the Society, have given a donation rather than a subscription; we appreciate their action very much indeed.

The subscription revenue has regrettably fallen from £41,760 to £35,809, but I am glad to say this is not such a heavy drop as was experienced in the previous year. I would here take the opportunity of impressing on Fellows and Associates that the work of the Society, which has now largely attained a national character, in co-operation with the Ministry of Agriculture, cannot be carried on without their generous support, and the support not only of themselves as subscribers, but also of their kindly influence in persuading their friends to join and assist in the good cause of horticulture now so vitally important for the food supplies of the country. The other source of revenue, namely Hall Lettings, shows a poor return, but that cannot be avoided and was to be expected. In 1941 we were only able to let the two Halls to the G.P.O. instead of for the holding of the Exhibitions as we did in 1940.

As you see the balance shows an excess of expenditure over revenue of £4,785, as compared with an excess of revenue over expenditure in 1940 of £455. Putting these two together you get in round figures a total difference of £5,000. This is chiefly due to the decrease in subscription income of £6,000 offset by a saving in special expenditure of £1,200.

In the Balance Sheet this item of £4,785 is charged against our General Reserve, together with an item of £4,751, for War Damage Insurance Contributions and Repairs: a large portion of that, if not all of it, will it is hoped in due course be recoverable. The Sinking Funds and Pension Fund have been maintained and now stand at £39,000 and £5,900, respectively, but that has been done at the cost of the cash balance which is reduced by £4,750.

I have drawn attention briefly to the principal points of interest, but I shall be pleased to try to answer any question you care to put. I would ask you to bear in mind my remarks as regards the contributions to the Society's funds, and to express the hope that you will not

only continue your own support, but exert every effort to increase our membership.

I have much pleasure in seconding the adoption of the Report and Accounts.

The CHAIRMAN : Before I put the Motion, does any Fellow wish to put any question ? If so, one of us will be delighted to deal with it. If there is no question, I will put the Motion

THAT the Report of the Council be and is hereby adopted.

(Motion put and carried unanimously.)

Mr. E. A. BOWLES : Mr. Chairman, Ladies and Gentlemen, it is customary at this moment in our Annual General Meetings for the Vice-Chairman of the Council to make an announcement to you, and it is also customary that you should all pretend to be ignorant as to who is going to be your President for the following year. I rather think you have all managed to guess the answer to that riddle correctly, but it is my duty to put it in a formal way.

At the unanimous request of the Council Lord ABERCONWAY allowed his name to be put forward for nomination as President, and by a certain By-law, I think it is 57, if nobody has been clever enough or foolish enough to put forward another name, Lord ABERCONWAY is duly elected. I therefore have the pleasure of announcing on this occasion that Lord ABERCONWAY has been duly elected as your President for the ensuing year.

The PRESIDENT : Ladies and Gentlemen, I should like to express my gratitude to the very many Fellows, some 25,000 in number, who might have nominated rivals for the Presidency. I see many budding Presidents and even "presidentesses" around me, and I am very grateful to By-law No. 57—by a curious coincidence the number of vegetables in Mr. Heinz's pickle collection—which prevents anyone nominating a rival at the last moment. I can only say I feel it a very distinguished honour to be President of this great Society, an honour that I value very much, and which I shall do my best worthily to sustain by doing what I can in the interests of the Society. I thank you.

I have now to declare the election without alternative nomination of the following Vice-Presidents :

The Duke of Portland.

The Marquess of Headfort.

The Viscount Ullswater.

Sir Daniel Hall.

Lieut.-Colonel Sir David Prain.

Mr. E. A. Bowles.

Mr. C. T. Musgrave.

Mr. C. G. A. Nix.

I also beg to declare the election as members of the Council, there being no alternative nominations, of :—

Mr. D. Ingamells.

Mr. C. T. Musgrave.

Mr. R. D. Trotter.

I also beg to declare the election of Mr. George Monro as Treasurer, and the election of Mr. J. S. Feather, of Messrs. Harper, Feather & Paterson, as Auditor. May I here say that the Auditors have given us most signal service throughout the year.

There will now be several presentations.

Victoria Medal of Honour.—To British Horticulturists resident in the United Kingdom and deserving special honour at the hands of the Society.

The SECRETARY : To Mr. E. L. HILLIER.

The PRESIDENT : Mr. HILLIER has introduced and cultivated a very great number of rare trees and shrubs. I have always deemed it a very great privilege to have had Mr. HILLIER conducting me round his nursery and showing me all his treasures. In later years he has been bitten by Rhododendrons, a mishap which until quite recently he was saved from owing to the fact that his nursery was situated on a chalky soil, but he found another bit of land with peat, and disaster resulted. I have great pleasure, Mr. HILLIER, in handing you the Victoria Medal of Honour which you have most deservedly earned.

As Associates of Honour the following have been elected :

Mr. W. D. BESANT, Director of Parks and Botanic Gardens, Glasgow.

Mr. G. F. HALLETT, Head Gardener at Lilford Hall, Oundle, Peterborough.

Mr. F. STREETER, Head Gardener at Petworth Park, Petworth, Sussex.

Mr. H. WINDIBANK, Head Gardener at Frensham Hall, Haslemere, Surrey.

The Veitch Memorial Medal in Gold.—To Mr. DONALD MACKELVIE.

The Veitch Memorial Medal in Gold.—To Mr. B. Y. MORRISON, of Washington, U.S.A.

The Veitch Memorial Medal in Gold.—To Mr. R. F. WILSON.

Veitch Memorial Medal in Silver and £25.—To Mrs. MALBY.

Veitch Memorial Medal in Silver.—To Mr. W. H. DIVERS, V.M.H.

The Loder Rhododendron Cup.—To Dr. J. MACQUEEN COWAN, for his work on the botany of the Rhododendron.

Mr. JOHNSTON : Ladies and Gentlemen, before we leave we shall all wish to pass a Vote of Thanks to our Chairman for presiding here to-day. I suppose many of us come here on this occasion for various and different reasons, chiefly no doubt of loyalty to the Society, but some of us in the hope that we may see some of our friends whom maybe we have not seen for some time, but all of us undoubtedly to support the President, Lord ABERCONWAY. I am sure a great many, like myself, come to enjoy the way in which Lord ABERCONWAY conducts this meeting. It is not only a pleasure but it is a lesson to those of us who would learn how to do it. It is the expression of our thanks to him that I now propose.

Mr. WALLACE : My Lord President, Ladies and Gentlemen, it gives me the utmost pleasure to second this Vote of Thanks. I have sat under many Presidents, five in all, I think, but there is one similarity between my first President, the late Sir TREVOR LAWRENCE, and our President to-day. I would depict them as the two greatest gardeners that ever sat in the Presidential chair. Sir TREVOR LAWRENCE in those days was a man similar to our President of to-day, in not being a very one-sided gardener ; he had no flair for one thing or the other, but he cultivated plants of all descriptions, and he was a very able President. But I must say he was not as is Lord ABERCONWAY what one might describe as " the guide, philosopher and friend," particularly in the way he distributes the medals and certificates to those who have the honour of receiving them, for all his kind words which briefly touch on the capabilities of those who are receiving the Society's awards are a lesson in themselves. I have the utmost pleasure in seconding the Vote of Thanks and ask you to pass it by acclamation.

The CHAIRMAN : Mr. JOHNSTON, Mr. WALLACE, Ladies and Gentlemen, I am very grateful for the too kind words used by the Mover and Seconder of this Motion. It must always be a pleasure to any President to preside over a meeting so cordial and so willing to make the best of any small thing, whether serious or jesting, which a speaker has to say. I thank you all, Ladies and Gentlemen. That concludes our meeting.

(The proceedings then terminated.)

DONATIONS TO THE SOCIETY'S GARDENS AT WISLEY, 1941.

ABERCONWAY, Lord, Tal-y-Cafn, N. Wales; plant of *Camellia saluensis* × *C. japonica*. ADAMS, J., Broadstone; grafts of Apple. AHRENDT, Rev. L. W. A., Watlington; cuttings of *Berberis micrantha* and *Cupressus arizonica* var. *conica*. ALBEMARLE, Countess of, Quidenham, Norwich; fruits of *Sorbus domestica* var. *pyriformis*. ALLEN, A. D., East Horsley, Surrey; seeds of *Leptospermum scoparium*. AMSLER, Dr. M., Hawkhurst, Kent; bulbs of *Nerina flexuosa* var. *alba*. BAKER, G. P., Kippington, Sevenoaks; plants of Iris species. BARNETT, H. T., Tilehurst, Reading; grafts of Pear 'Comte de Paris.' BARR AND SONS, Taplow, Bucks; bulbs of *Lilium pardalinum* var. 'Ilma Watson.' BEES LTD., Chester; bulbs of *Lilium* 'Ilma Watson.' BOOTHMAN, H. S., Furze Platt, Maidenhead; collection of seeds. BOSCOMBE, W., Wokingham; cuttings of *Ceanothus coeruleus* and *Sphaeralcea* (*Malvauscus*) *Fendleri*. BOWLES, E. A., Enfield, Middx.; collection of plants. BRAND, D. E., Symington, Lanarkshire; seeds of *Gentiana verna*. BURNS, A., Hutton, Essex; collection of seeds, plants and bulbs. BUTTON, C., Cranham, Essex; plant of *Rhododendron repens* (?), seeds of hybrid *Lewisias*. BYNG OF VIMY, Viscountess, Ottawa, Canada; collection of seeds. CAMPBELL, A., Pannal, nr. Harrogate; plant of Saxifrage 'Edie Campbell.' CARTERS' LTD., Raynes Park, S.W. 20; collection of seeds. CHANDLER, A. L., Taddington, Derbys.; collection of seeds from New Zealand. CHEAL AND SONS, Crawley, Sussex; grafts of Apples. CHITTENDEN, F. J., Dedham, Essex; seeds of Bean 'Comtesse de Chambord.' CLARKE, Colonel STEPHENSON R., Haywards Heath, Sussex; collection of plants. COLEMAN, C. F., Cranbrook, Kent; seeds of *Lilium pyrenaicum*. COLLINSON, Miss D., Cobham, Surrey; seeds of *Gentiana verna* var. *alba*. COLOMB, Miss, Chelsea, S.W. 3; seeds of Dutch Brown Beans. CONSTABLE, W. A., Ltd., Tunbridge Wells; bulbs of *Lilium pardalinum* var. *pallidifolium*. DALRYMPLE, G. H., Bartley, Southampton; seedlings of *Primula pulverulenta*, Bartley Strain. DAVY, E. W., Teignmouth; plant of *Eucalyptus Morrisbyi* and seedlings of *Aster Papei* × *ameloides*. DESBOROUGH, Lady, Broadstone; seeds and bulbs of *Fritillaria camschatcensis*. DICKINS, C. SCRASE, Horsham, Sussex; plants of *Rhododendron bullatum*. DICKINSON, Miss K., St. Albans; plant of *Anemone pulsatilla*. DOBBIN, Mrs. M. A., Blackshiels, Midlothian; collection of seeds. DONARD NURSERY Co., Newcastle, Co. Down; collection of Escallonias. DURHAM, H. E., Cambridge; collection of seeds and plants. EDINBURGH ROYAL BOTANIC GARDEN; collection of seeds and plants. FENWICK, M., Stow-on-the-Wold; collection of plants. FUCHSIA SOCIETY, Sandhurst, Glos; collection of Fuchsias. GODMAN, Dame A., Horsham, Sussex; collection of plants and cuttings. GOODWIN, A. R., Kidderminster; collection of plants. GOULD, N. K., West Byfleet; bulbs of *Narcissus olubus*, seeds of *Lunaria biennis*. GRIEVE, Mrs. M., Barkway, nr. Royston; books and pamphlets on Herbs. GRISSELL, Lt.-Col. T. D., Dorchester; grafts of Apple 'Golden Bitter-Sweet.' HADDEN, N. G., West Porlock, Somerset; collection of seeds. HARLEY, A., Kirkcaldy; seeds of *Nomocharis*. HAWKER, Captain H., Ermington, S. Devon; Beans 'Comtesse de Chambord' and 'Dutch Brown.' HEADFORT, Marquess of, Kells, Co. Meath; seeds of *Embothrium coccineum*. HELY-HUTCHINSON, Mrs., Ely; seeds of *Digitalis*. HENRY, Mrs. M., Pennsylvania, U.S.A.; collection of seeds. HICKMAN, C. J., Evesham; plants of Strawberry 'Old-fashioned Sovereign.' HILLIER AND SONS, Winchester; fruits of *Sorbus magnifica*. HILLING, T., & Co., Chobham, Surrey; collection of seeds and plants. HOGGETT, A., Market Rasen, Lincs; plant of *Salvia Grahamii*. HOLT, R. W., Wirtal, Cheshire; plants of *Muehlenbeckia complexa*. HUTTON, C. H., Gt. Witley, nr. Worcester; grafts of Apple 'Forester.' INGLIS, Mrs., Holywood, Co. Down; cuttings of *Cistus purpureus*. INGRAM, C., Cranbrook, Kent; collection of plants. INNES, JOHN, Hort. Inst., Merton, S.W. 19; buds of Plums, collection of *Tulipa* species, plants of Strawberry and seeds. JACKMAN, G., & SONS, Woking; grafts of Apple 'Curl Tail', and cuttings. JEKYLL, F., Godalming; plants of Fuchsia. JENKIN, Dr. N. W., Hindhead; collection of plants and cuttings. JOHNSON, Rev. W. R., St. Ervan, N. Cornwall; collection of seeds. JONES, A. GAVIN-, Letchworth; plants of *Gypsophila repens* Letchworth var. KAYE, W. J., Guildford; seeds of *Caesalpinia pulcherrima*. KENWAY, P. T., Godalming; plant of Seedless Orange 'Mimulus.' Kew ROYAL BOTANIC GARDENS; collection of plants. LAINSON, R. D., Piltown, Sussex; cuttings of *Gazania* and plant of *Begonia semperflorens* var. *plena*. LAMBE, R. F., W. Coker, nr. Yeovil; seeds of *Astrocoermeria aurantiaca* (?) and *Veronica spicata*. LAXTON Bros., Bedford; grafts of Malus, Apples and Plums. LESCHALLAS, Capt.,

Prestbury, Glos.; collection of cuttings. LINDLEY, E. S., Wotton-under-Edge, Glos.; seeds of *Anemone sulphurea*. LLOYD BOTANIC GARDEN, Darjeeling, India; collection of seeds. LOARRIDGE, A. J., Send, Woking, Surrey; cuttings of *Camellia japonica*. LOGAN, Lt.-Col. M. H., Glasbury-on-Wye; plants of large White Delphiniums. LOWNDES, Major D. G., Ringwood, Hants; seeds of *Lilium polyphyllum*. MACAULAY INST. FOR SOIL RESEARCH, Aberdeen; copy of 'Collected Papers,' vol. I. MAGOR, E. J. P. (the late), St. Tudy, Cornwall; seedlings of *Rhododendron Beanianum*. MALLING, EAST, RES. STATION; Red Currants and Raspberry canes. MARTINEAU, Lady, Sunningdale, Berks; seeds and plant of *Salvia Sclarea Vaticani*. MCCONNELL, Mrs. T., Belfast; cuttings of *Cupressus obtusa* var. *filicoides* (?) and *Pernettya mucronata* Bell's seedling. MCLEAN, W. J. H., Darlington; seeds of *Verbascum Broussa* x *V. olympicum*. METAL BOX CO., Acton, W. 3; seeds of Soya Beans. MILLARD, F. W., Felbridge, Surrey; seedling plants of Berberis and Mahonia. MILNER, Sir Wm., Appletrewick, Skipton; seeds of *Primula Florindae*. MITCHELL, W. J., Tetbury, Glos.; fruits of Sorbus. MOORE, H. ARMYTAGE, Saintfield, Co. Down; plants of Primula 'Rowallane Rose' and *Thalictrum* sp. MULLIGAN, B. O., Send, Surrey; plants and cuttings. MULLIGAN, Mrs., Belfast; cuttings of *Daphne odorata* and *Drimys aromatica*. MUSGRAVE, C. T., Godalming; collection of plants. PALMER, Hon. L., Sutton Scotney, Hants; collection of seeds, bulbs and plants. PENNELL, J., Kingston Hill; collection of seeds. PENTLAND, Lady, Guildford; seeds of Soya Bean. PERRETT, H., Lewes, Sussex; plants of *Iris unguicularis*, seedling Michaelmas Daisy 'Royal Purple'. PERRY, A., Enfield; plants of *Euonymus cornutus*. PRESTON, F. G., Univ. Bot. Gdn., Cambridge; plants of *Allium fistulosum*. PRIOR, A. V., Boxmoor, Herts; seeds of *Hyoscyamus niger*. PUGSLEY, Mrs., Woking; plants of Variegated Balm and Variegated Mint. RAMSDEN, Sir J., Bt., Gerrards Cross; plant of *Camellia japonica* 'Adolphe Andusson'. RATCLIFF, Mrs. W. M., Cold Ash, nr. Newbury; seeds of Gaillardia. READER, W. R., Calgary; seeds of *Sanguinaria canadensis* and *Vaccinium canadense*. ROBB, A. J., Rowlands Castle; collection of seeds. ROBINSON, G. W., Chelsea Physic Garden; plant of *Allium fistulosum* and *A. tuberosum*. ROGERS, R. B., Launceston; grafts of Apple 'Luccombe Seedling'. SALE AND SONS, Wokingham; plants of seedling Strawberry 'Victory'. SANDERSON, Rev. F., Dorking; copy of 'Poisonous Plants in Field and Garden.' SCHREIBER, Captain, Woodbridge, Suffolk; plant of *Campsis radicans*. SEXTON, C. E., Redhill; plants of Cistus. SHELDON, W. G., Oxted, Surrey; collection of seeds. SHERRIFF, Captain G., Bombay; collection of seeds from Himalaya. SMYTHE, Miss A., Farnham; seeds of Lupin. SOPPER, Lt.-Col., Easter Aberchalder; collection of seeds. STEPHENS, J. R., Newquay; cuttings of two forms of *Cheiranthus mutabilis*. STERN, Major F. C., Goring-by-Sea; collection of seeds. ST. LAWRENCE, T. J., Gaisford, Howth Castle, Dublin; collection of Helianthemums. STONOR, F., Parkgate, nr. Southampton; runners of Strawberry 'Stonor's Early'. STUTTAFFORD, Rev. J. J., Exmouth; seeds and plant of Meconopsis from Kurdistan. SUTCLIFFE, Mrs. G., Ledbury; forms of Welsh Onions. SUTTON & SON, Reading; collection of seeds of annuals. TAYLOR, Mrs., Staines; root of Eremurus. THERKILDSEN, K., Kew, Southport; plants of *Viola Therkildsenii*. TOD, Dr. H., Fairmilehead, Edinburgh; cuttings of Fig. TOMALIN, T. E., Rowlands Castle; grafts of Apple 'Paul's Winter Hawthornden' and cuttings of hybrid Lilacs. TREHORNE, D. C., Staplehill, Wimborne; suckers of *Rosa rugosa* 'Agnes'. TROTTER, R. D., Ockley, Surrey; collection of plants, corms, cuttings and seeds. TWEED, R. W., Univ. Coll. of N. Wales, Bangor; suckers of *Rosa involuta* var. *Wilsonii*. UNKNOWN DONOR; grafts of Plum Mitchelsons. VAWDREY, Dr. E., East Horsley, Surrey; R.H.S. Journals. WALES, UNIV. OF, Bangor; collection of 100 sheets of Swiss plants dried, mounted and named. WALLACE, R., & Co., Tunbridge Wells; collection of Colchicum corms. WATERER, Miss G., Penzance; seeds of *Soldanella montana*. WATSON, A. K., Acle, Norfolk; grafts of Apple 'Togo of Upton'. WATTS, W. A., St. Asaph; seeds of *Lilium regale* and *Tulipa dasystemon*. WHITTALL, Mrs. W. J., Haslemere; plants of *Hydrangea serrata* Grayswood. WILLIAMS, C. T., Bristol; collection of cuttings and seeds. WILLIAMSON, Mrs. K. H., Aberdeen; collection of seeds and plants. WILSON, G. Fox, W. Byfleet; cuttings of *Hibiscus syriacus*. WITHERS, Mrs. K. M., Shepperton-on-Thames; back numbers of R.H.S. Journal. WOOD, C. F., Haywards Heath; plants of *Titanotrichum (Rehmannia) Oldhamii*. YOUNG, H. E., Fakenham, Norfolk; grafts of unknown Plum.

GENERAL MEETINGS.

FEBRUARY 17, 1942.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and twenty-four other members present.

Award Recommended :—

Gold Medal.

To Messrs. Sutton & Sons, Reading, for collection of vegetables (24 for, 0 against);

Other Exhibits.

Collection of vegetables, from Messrs. Allwood Bros., Haywards Heath.

Borecole Barr's Ornamental Kale, from Messrs. Barr & Sons, Taplow and London.

Apple 'Adam's Pearmain,' from Mr. Howard H. Crane, Highmead, Cheney Lane, Eastcote, Pinner.

Collection of vegetables, from the Director, R.H.S. Gardens, Wisley.

Collection of vegetables, from the Federation of Middlesex Horticultural Allotment Societies.

Seedling Apple, from Mr. F. Howe, 35 Cambridge Street, Wellingborough, Northants.

Apple 'Harpole Victory,' from Mr. H. A. Robins, Harpole, Northampton.

Collection of Apples, from R.H.S. Commercial Fruit Trials, Wisley.

Apple 'Heusgen's Golden Reinette,' from R.H.S. Commercial Fruit Trials, Wisley.

Seedling Apple, from Mr. A. Wallace, Tudor Cottage, Wormley, Hoddesdon, Herts.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Banksian Medal.

To the Stuart Low Co., Enfield, for an exhibit of Carnations.

Silver Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

To Messrs. C. Engelmann Ltd., Saffron Walden, for an exhibit of Carnations, *Echeveria retusa hybrida* and *Euphorbia fulgens*.

Other Exhibits.

Chrysanthemum 'Rose Harrison,' from Messrs. A. G. Vinten, Ltd., Balcombe, Sussex.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering trees and shrubs.

To Messrs. Hillier & Sons, Ltd., Winchester, for an exhibit of flowering trees and shrubs.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of rock garden plants and shrubs.

Flora Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering shrubs.

To Messrs. D. Stewart & Son, Ltd., Ferndown, Dorset, for an exhibit of flowering shrubs.

Banksian Medal.

To Messrs. Barr & Son, Ltd., Taplow, for an exhibit of Crocus species and Narcissi.

To the Stuart Low Co., Enfield, for an exhibit of flowering shrubs.

Other Exhibits.

Berberis asiatica, *Camellia* 'Marjorie Carlyon,' exhibited by the Tregrehan Nurseries, Tregrehan, Par, Cornwall.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

FEBRUARY 17-18, 1942.

ORCHID COMMITTEE.—Mr. GURNEY WILSON in the Chair, and twelve other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To the Stuart Low Co., Jarvis Brook, Sussex, for a group of Orchids.

Award of Merit.

To *Cypripedium* × 'Harmony' ('Melody' × 'Ruth') (unanimous), from the Rt. Hon. Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. 211.

To *Cypripedium* × 'Hellas,' Westonbirt var. ('Desdemona' × 'Tania') (votes 9 for, 1 against), from Messrs. H. G. Alexander, Ltd., Tetbury, Glos. See p. 211.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and four other members present.

Award Recommended :—

Silver-gilt Flora Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Daffodils in pots.

New Plants.

There were no new plants before the Committee.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and eight other members present.

Award Recommended :—

Award of Merit.

To *R.* × 'Olive' (*R. moupinense* × *R. dauricum*) (votes 7 for, 0 against), as a hardy early-flowering plant, from Sir John Stirling Maxwell, Bt., K.T., Pollok House, Glasgow. See p. 211.

Other Exhibits.

R. giganteum, from Mrs. Carlyon, Tregrehan Nurseries, Par, Cornwall. This plant was referred to the Royal Botanic Garden, Edinburgh.

Specimens of five hybrid Javanese Rhododendrons (which had previously received awards), from Lord Aberconway.

MARCH 17-18, 1942.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and ten other members present.

Seed in Fireplace.—Dr. Tincker reported that the seed referred to at the last meeting, dropped by birds down a chimney, had proved to be that of *Rhamnus Frangula*.

Birds and Bark.—Mr. G. Fox-Wilson showed branches of Plum trees stripped of bark by tits and greenfinches in their search for bark beetles which were attacking the trees after damage by a bacterial disease.

Insects that visit flowers.—Mr. C. H. Hooper showed some cases of insects taken on fruit flowers to illustrate the range which take part in pollination in orchards. He also showed a bumble-bee's nest.

Queen Wasps visiting trees with bursting buds.—Dr. Barnes and Mr. Bowles referred to the frequency of queen wasps on Cotoneasters and Hawthorns before the flowers appear, and it was suggested that they were searching for such insects as Woolly Aphis which often occurs on Cotoneaster and Psylla on Hawthorns.

Onion × Leek cross ?—Mr. A. G. Senhenn of Ealing sent seeds saved from a plant raised from an Onion growing next a Leek, both of which were in flower at the same time, and which he thought showed some characters of the Leek in

its slender, stiff, woody stem, ribbed capsules and dead black seeds, and perhaps in the presence of bulbs in the seed head. He had before observed similar things in Onion seed heads but had failed to raise plants from the seeds, and the Leek planted among the Onions failed to produce fertile seed. No member of the Committee knew of an authentic instance of a fertile cross between Onion and Leek. Some of the seed sent appeared to contain an embryo, and the Committee suggested that Mr. Senhenn should be asked to attempt to raise seedlings and report the result to the Committee. Mr. Senhenn also drew attention to the presence of small red larvæ among the seeds and these proved to be the larvæ of a small two-winged fly, a species of *Diplosis*, very common in Onion and Leek heads, especially when they are damp.

Crocuses.—Mr. E. A. Bowles showed a number of *Crocus* flowers including the beautiful white form of *C. Sieberi* which had occurred in his garden, and some crosses between the typical *C. Sieberi* and its variety *heterochromus*; *C. Balansas*; many forms of *C. Tomasianus* including pink, various shades of mauve, and the dark tipped variety *pictus*; hybrids between *C. Tomasianus* and *C. vernus* and many forms of *C. chrysanthus* and *C. chrysanthus Weidenii*.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and thirteen other members present.

Exhibits.

Collection of Vegetables, from Messrs. Allwood Bros., Haywards Heath.

Sample of Apple 'Sturmer Pippin,' which had been dipped in a solution of Monkey Nut Oil and water in order to keep the fruit, from Mr. M. B. Crane, John Innes Horticultural Institution, Merton, S.W. 19.

Exhibit of Broccoli and Cabbage packed for market, from Messrs. R. Gill & Son, Himalayan Nurseries, Penryn, Cornwall.

Collection of Haricot Beans, from the Director, R.H.S. Gardens, Wisley.

Collection of Apples, from R.H.S. Commercial Fruit Trials, Wisley.

Apple 'Heusgen's Golden Reinette,' from R.H.S. Commercial Fruit Trials, Wisley.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and thirteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations, Pansies, *Echeveria retusa hybrida* and *Euphorbia fulgens*.

Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Banksian Medal.

To the Stuart Low Co., Enfield, for an exhibit of Carnations.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering trees and shrubs.

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of rock garden plants and shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering trees and shrubs.

Flora Medal.

To Messrs. R. Gill & Son, Penryn, Cornwall, for an exhibit of Rhododendrons.

To Messrs. D. Stewart & Son, Ltd., Ferndown, Dorset, for an exhibit of flowering shrubs and rock garden plants.

To the Stuart Low Co., Enfield, for an exhibit of greenhouse plants and shrubs.

Banksian Medal.

To Messrs. Barr & Sons, Ltd., Taplow, for an exhibit of Narcissi and Crocuses.

First Class Certificate.

To *Camellia* × 'J. C. Williams' as a hardy flowering shrub (votes 16 for, 0 against), from C. Williams, Esq., M.P., Caerhays Castle, Gorran, Cornwall. See p. 210.

Award of Merit.

To *Camellia reticulata* 'Mary Williams' as a hardy flowering shrub (votes 14 for, 1 against), from C. Williams, Esq., M.P. See p. 210.

To *Camellia* × 'Mary Christian' as a hardy flowering shrub (votes 14 for, 0 against), from C. Williams, Esq., M.P. See p. 210.

Other Exhibits.

Flowering shrubs, exhibited by Mrs. K. Hopkinson, Coulsdon, Surrey, and Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames.

ORCHID COMMITTEE.—Mr. GURNEY WILSON in the Chair, and eleven other members present.

*Awards Recommended :—**Silver-gilt Banksian Medal.*

To Messrs. J. & A. McBean, Cooksbridge, for a group of Orchids.

To the Stuart Low Co., Jarvis Brook, for a group of Orchids.

First-class Certificate.

To *Cymbidium* × 'Roxana,' Castle Hill var. ('Laburnum' × 'Pearl') (votes 9 for, 2 against), from Major the Hon. H. S. Tufton, Castle Hill, Englefield Green, Surrey. See p. 211.

Award of Merit.

To *Cymbidium* × 'Rowena,' Castle Hill var. ('Rosy Queen' × 'Coronet') (votes 10 for, 1 against), from Major the Hon. H. S. Tufton, Castle Hill, Englefield Green, Surrey. See p. 211.

To *Cymbidium* × 'Olympus' var. 'Invincible' (*Alexanderi* × 'Vesta') (unanimous), from the Stuart Low Co., Jarvis Brook. See p. 211.

To *Cymbidium* × 'Goura,' Charlesworth's var. (*Norrisii* × *Alexanderi*) (votes 9 for, 0 against), from Messrs. Charlesworth & Co., Haywards Heath. See p. 210.

To *Cypripedium* × 'Golden Radiance' ('Eldorado' × 'Sunbeam') (unanimous), from Messrs. H. G. Alexander, Ltd., Tetbury. See p. 211.

Cultural Commendation.

To Mr. H. H. Brown, gardener to Major the Hon. H. S. Tufton, Castle Hill, Englefield Green, for *Cymbidium* × 'Babylon' (*Pauwelsii* × 'Olympus'), a robust plant carrying three spikes with a total of 28 rose-pink flowers.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and nine other members present.

The Minutes of the last meeting, held on March 17, were read and confirmed.

Exhibits.

There were no groups or new plants for the Committee's consideration.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and seven other members present.

Exhibits.

There were no exhibits before the Committee on this occasion.

Identification of Rhododendron.

It was reported that a letter had been received from the Director of the Royal Botanic Garden, Edinburgh, stating that the specimen submitted to them last time was almost certainly *Rhododendron protistum*.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. E. B. ANDERSON in the Chair, and eight other members present.

*Award Recommended :—**Preliminary Commendation.*

To *Primula* 'Pandora' (♀ *P. scapigera* × ♂ *P. Edgworthii*) (votes 7 for, 0 against), as a flowering plant for the alpine house, from Mrs. C. B. Saunders, Hussey, Green Street Green, Farnborough, Kent.

APRIL 14, 1942.

SEWELL MEDAL COMPETITION.

Amateur's Medal.

To Dr. P. L. Giuseppi, Felixstowe.

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Horticultural Trader's Medal.

To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead.

AWARD OF GARDEN MERIT.

The above Award was made to *Caryopteris* × *clandonensis* and *Calluna vulgaris* 'H. G. Beale.'

The Engleheart Challenge Cup, for 12 varieties of Daffodils raised by the Exhibitor.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Cabbage White Fly.—Mr. G. F. Wilson showed maps demonstrating the connection between the distribution in England of the Cabbage White Fly and the mean annual temperature, the distribution following very closely the 49° isotherm. The incidence of low temperature did not appear to be the determining factor in its distribution.

Polycotyledony in Radish.—Dr. Barnes showed seedling Radishes with three cotyledons (he had found three such) and one seedling with one cotyledon split into two lobes. He remarked upon the apparent rarity of this condition in Radishes. It is common in some plants, e.g. *Antirrhinum*.

Doubling in Narcissus.—Mr. Bowles showed a series of double forms of Narcissi including 'Rip van Winkle' where doubling appears to be due in the main to repeated splitting of the corona, the pieces of the perianth present being very narrow; 'Queen Anne's Daffodil,' *Narcissus cystellensis*, where it is due to repetition of the perianth segments, no trace of the corona being present; a curious double form with golden segments much less double than *Telamonius plenus*, which occurred in an Irish garden and greatly resembled one figured by Parkinson; *Telamonius plenus* consisting of double outer perianth segments, then perianth and coronal segments repeated until the fertile anthers are reached, the ovary being absent; double 'Sir Watkin,' the outer perianth segments being duplicated followed by two series of perianth and coronal segments, introduced by Messrs. Blom. He also showed regularly tetramerous flowers of *N. scoticus*, some examples of which are annually produced.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Gold Medal.

To Mr. F. A. Secrett, Bell Farm, Hersham, for a collection of vegetables packed for market.

Other Exhibits.

A collection of vegetables, from Messrs. Allwood Bros., Haywards Heath, Sussex.

Apples 'D'Arcy Spice' and 'Rushock Pearmain,' from Mr. H. Barnett, Westwood House, Tilehurst, Berks.

A collection of vegetables, from the Director, R.H.S. Gardens, Wisley.

FLORAL COMMITTEE A.—Mr. D. INGAMELLS in the Chair, and eleven other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

Banksian Medal.

To the Stuart Low Co., Enfield, for an exhibit of Carnations.

Selected for trial at Wisley.

Cheiranthus 'Cornish Cream,' Cheiranthus 'Mrs. Creswell Payne,' Cheiranthus 'Sir John Eliot,' from J. Stephens, Esq., Newquay.

Other Exhibits.

Hippeastrum 'Stella,' from S. B. Rothwell, Esq., Cooksbridge, Sussex.
(To be seen again.)

Primrose 'Galliard's Seedling,' from C. Ingram, Esq., Benenden, Kent.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

APRIL 14, 1942.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and eighteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering trees and shrubs.

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering trees and shrubs.

Silver Banksian Medal.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of a rock garden.

To the Stuart Low Co., Enfield, for an exhibit of Camellias and greenhouse plants.

Flora Medal.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering trees and shrubs.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of alpine plants.

Award of Merit.

To *Lonicera Griffithii* as a flowering shrub for the greenhouse (votes 13 for, 2 against), from the Director, R.H.S. Gardens, Wisley. See p. 277.

To *Magnolia Kobus* as a hardy flowering tree (votes 8 for, 4 against), from Lord Aberconway, C.B.E., V.M.H., Bodnant, S. Wales. See p. 277.

To *Magnolia Sprengeri* as a hardy flowering tree (votes 15 for, 0 against), from Lord Aberconway. See p. 277.

Other Exhibits.

Erica australis, white form, exhibited by Collingwood Ingram, Esq., Benenden, Kent.

Pamianthe peruviana, exhibited by Major V. Cazalet, M.P., Cranbrook.

Rock garden plants, exhibited by Mrs. K. Hopkinson, Coulsdon, Surrey.

ORCHID COMMITTEE.—Mr. GURNEY WILSON in the Chair, and nine other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To the Stuart Low Co., Jarvis Brook, for a group of Orchids.

Award of Merit.

To *Cymbidium* × 'Galaxy,' Sutherlands var. ('Goldfinch' × *Alexandri*), (votes 7 for, 1 against), from Col. E. M. Perry, C.B.E., Sutherlands, Wimbledon. See p. 276.

To *Dendrobium* × 'Montrose' (*Ainsworthii* × *Thwaitesiae*) (votes unanimous), from J. V. Rank, Esq., Ouborough, Godstone, Surrey. See p. 276.

To *Cymbidium* × 'Riga' var. 'Nobilior' ('Swallow' × 'Pearl') (votes unanimous), from Messrs. J. & A. McBean, Cooksbridge. See p. 276.

To *Miltonia* × 'April' ('Robert Paterson' × 'Mrs. J. B. Crum') (votes unanimous), from Messrs. Black & Flory, Slough. See p. 277.

To *Laeliocattleya* × 'Winter Belle' (*Lc.* 'Bella' × *C.* 'Titrianæ') (votes 6 for, 2 against), from the Stuart Low Co., Jarvis Brook. See p. 276.

Cultural Commendation.

To Mr. C. J. Salter, gr. to J. V. Rank, Esq., Ouborough, Godstone, Surrey,

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for *Dendrobium* × 'Montrose,' bearing 144 flowers, and also for *Dendrobium* × 'Butterfly,' bearing 100 flowers.

To Messrs. J. & A. McBean, Cooksbridge, for *Cymbidium* × 'Susette' var. 'Perfection,' with numerous rose-pink flowers.

NARCISSUS AND TULIP COMMITTEES.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and seventeen other members present.

The Chairman referred to the loss which the Daffodil world had sustained through the death of Mr. Herbert Smith and the Secretary was requested to convey the Committee's sympathy to Mrs. Smith.

Awards Recommended :—

Gold Medal.

To Mr. J. L. Richardson, Prospect House, Waterford, for an exhibit of Daffodils.

Silver-gilt Flora Medal.

To Messrs. Barr & Sons, 13 King Street, Covent Garden, W.C. 2, for an exhibit of Daffodils.

To Mr. Guy L. Wilson, Broughshane, Co. Antrim, for an exhibit of Daffodils.

Silver-gilt Banksian Medal.

To the Slieve Donard Nursery Co., Newcastle, Co. Down, for an exhibit of Daffodils.

Silver Flora Medal.

To Messrs. D. Stewart & Son, Ferndown, Wimborne, for an exhibit of Daffodils.

Award of Merit.

To *Narcissus* 'Buncrana' as a variety for exhibition (votes 8 for, 1 against). Raised and shown by Mr. J. L. Richardson. See p. 277.

To *Narcissus* 'Cotopaxi' as a variety for exhibition (votes 14 for, 0 against).

Raised and shown by Mr. J. L. Richardson. See p. 277.

To *Narcissus* 'Galway' as a variety for exhibition (votes 10 for, 3 against).

Raised and shown by Mr. J. L. Richardson. See p. 277.

To *Narcissus* 'Kingscourt' as a variety for exhibition (votes unanimous).

Raised and shown by Mr. J. L. Richardson. See p. 277.

To *Narcissus* 'Narvik' as a variety for exhibition (votes 15 for, 1 against).

Raised and shown by Mr. J. L. Richardson. See p. 278.

To *Narcissus* 'Shannon' as a variety for exhibition (votes 10 for, 2 against).

Raised and shown by Mr. J. L. Richardson. See p. 278.

Plants selected for trial.

Narcissus 'Flamenco,' shown by Mr. J. L. Richardson, was selected for trial at Kirtan as a variety for garden decoration.

Narcissus 'April Tears' and *N.* 'Raindrop,' both from Mr. Alec Gray, Penpol, Devoran, Cornwall, were selected for trial at Wisley as varieties for the rock garden, on the understanding that the name of the second variety was to be changed.

Daffodil Trial at Wisley.

The Chairman reported that as the whole of the Daffodil Trial at Wisley was replanted in 1941, the Committee would not be required to inspect the Trial until 1943.

The Peter Barr Memorial Cup.

It was unanimously recommended that the Peter Barr Memorial Cup, which is awarded annually to someone who has done good work on behalf of the Daffodil, be awarded to Mr. A. Simmonds.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

Award of Merit.

To *Rhododendron pentaphyllum* (votes 10 for, 0 against), from Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. 278.

To *Rhododendron* × *chrysaspis* (*R. chrysodoron* × *R. leucaspis*) (votes 10 for, 0 against), from Lord Aberconway. See p. 278.

To *Rhododendron* × 'Circe' (*R.* × 'May Day' × *R.* × 'Elizabeth') (votes 10 for, 0 against), from Lord Aberconway. See p. 278.

Other Exhibits.

Rhododendron hybrid (? *R. oreodoxa* × *R. fulvum*), *R. sperabiloides* ?, *R. Thomsonii grandiflorum* × *R. sulchuense*, and *Rhododendron* hybrid, from Dame Alice Godman, D.B.E., South Lodge, Horsham, Sussex.

Rhododendron sutchuenense hybrid ? and *R. moupinense* × *R. sperabile*, from Collingwood Ingram, Esq.

Rhododendron × 'Lucil' and *R. aporantum* Pink variety, from Lord Aberconway.

Rhododendron × 'Ted Marchand,' from Collingwood Ingram, Esq. It was decided that this plant should be sent to the Royal Botanic Garden, Edinburgh.

Rhododendron aporantum in various colours, from Lord Aberconway; *R. coryphaeum* and *R. pachytrichum* × *R. Falconeri*, from Dame Alice Godman.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Lady LAWRENCE in the Chair, and six other members present.

Awards Recommended :—

Award of Merit.

Celsia acaulis (votes 7 for, 0 against), as a hardy plant for the alpine house, from Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, Kent. See p. 276.

Other Exhibits.

Douglasia montana and *Rhododendron Forrestii chamaethauma*, from Dr. P. L. Giuseppi, Trevoise, Felixstowe.

May 19, 1942.

The Sewell medal for the best exhibit of three pots or pans of plants suitable for the rock garden or Alpine House shown by an amateur, was awarded to Dr. P. L. Giuseppi, Felixstowe.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and six other members present.

Erodium sp.—An *Erodium* referred from Floral Committee B for naming was examined and the habit and mucronate sepals showed it to agree most nearly with *E. pelargoniflorum*, not *E. hymenodes* under which name it had been sent.

Lily Beetle, etc.—Mr. G. F. Wilson reported that the Lily Beetle had survived the winter at Chobham, Surrey, in the open, though the temperature in the past winter fell there to 1° F. It is therefore evident that the winter climate cannot be depended upon to prevent the spread of this pest which has recently become established there. He also made some remarks upon an Australian parasite of the mealybug, *Pseudococcus gahani*, a native of Australia. This mealybug is now a common species in England, both under glass and in the open where it attacks *Ceanothus*, *Ribes sanguineum*, *Robinia Pseudacacia*, etc.

Potash in decayed garden refuse.—Dr. Tincker reported that he had recently examined rotted garden refuse from compost heaps and found the amount of potash (K₂O) to vary between 0.85 and 0.35 per cent., the average in farmyard manure being 0.4 per cent. The samples examined varied considerably in the amount of water contained and this no doubt accounted in part for the variation found, but it seems evident that rotted garden refuse returns to the soil as much potash as equal quantities of farmyard manure would add.

Proliferous Muscari armeniacum.—Mr. Bowles showed examples of *Muscari armeniacum* of the same type as that shown by *M. comosum monstrosum*, but of a different colour, and probably of the same origin as those shown before the Committee in 1937. The name *M. armeniacum proliferum* was suggested as suitable for this form.

Fruiting of Agave Parryi.—Mr. Bowles reported that a plant of *Agave Parryi*, which had grown in the open at Myddelton House for the past 40 years, last year flowered, throwing up a spike 12 feet high. The flowers were red without and bright yellow within. Ripe seed had been secured after hand-pollination. Mr. Preston said that *A. Parryi* had flowered at Cambridge (Mr. Bowles' plant had originally come from there), but had not produced fruit, possibly because it had not been pollinated, but had formed some bulbils in the inflorescence. The rosette that had flowered at Myddelton House had died, but offsets produced were living.

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. CHEAL in the Chair, and seventeen other members present.

Award Recommended :—

Gold Medal.

To Messrs. F. A. and A. W. Secrett, Walton-on-Thames and Send, for a collection of vegetables.

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Other Exhibits.

A collection of vegetables from Messrs. Allwood Bros., Haywards Heath.

A collection of Rhubarb from The Director, R.H.S. Gardens, Wisley.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and fourteen other members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations, Pansies, and *Streptis Reginae*.

Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Other Exhibits.

Aster Amellus var. (to be seen again), from Miss A. C. Tidswell, Needham Market.

Carnations from the Stuart Low Co., Enfield.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Rhododendrons.

Silver-gilt Banksian Medal.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of rock-garden plants.

To the Stuart Low Co., Enfield, for an exhibit of flowering shrubs and greenhouse plants.

To Messrs. Notcutt, Woodbridge, Suffolk, for an exhibit of Lilacs.

To the Exors. of the late Lionel de Rothschild, Esq., Exbury, Southampton, for an exhibit of Rhododendrons.

Silver Flora Medal.

To Messrs. Hillier & Sons, Winchester, for an exhibit of Rhododendrons and other flowering shrubs.

To Mr. Amos Perry, Enfield, for an exhibit of hardy plants.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of Lilacs and other flowering plants.

Silver Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To Messrs. J. Cheal & Sons, Ltd., Crawley, Sussex, for an exhibit of Lilacs and other flowering shrubs.

Flora Medal.

To Messrs. W. E. Th. Ingwersen, Ltd., East Grinstead, for an exhibit of alpine plants in pans.

Award of Merit.

To *Berberis calliantha* as a hardy flowering shrub (votes unanimous), from the Director, Royal Botanic Gardens, Kew. See p. 276.

To *Paeonia suffruticosa* var. 'Haku-unryo' as a hardy flowering shrub (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales. See p. 278.

To *Syringa* 'Maureen' as a hardy flowering shrub (votes unanimous), from the Rt. Hon. Lord Bessborough, Stansted Park, Rowlands Castle, Hants. See p. 279.

Selected for Trial at Wisley.

Iris longipetala × *montana*, exhibited by W. B. Cranfield, Esq., V.M.H., Enfield Chase, Middlesex.

Other Exhibits.

Berberis concinna var. *nana* (to be seen again in fruit), *Chaenomeles japonica* fl. pl. and *Ornithogalum* sp. from Collingwood Ingram, Esq., Benenden, Kent.

Buddleia Farreri, *Erodium hymenodes* and *Schizandra rubrifolia* from the Director, Royal Botanic Gardens, Kew.

Magnolia Wilsonii seedlings from C. R. Scrase-Dickins, Esq., Coolhurst, Horsham, Sussex.

Paeonia suffruticosa var. 'Hakugan,' from Lord Aberconway.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

MAY 19, 1942.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, in the Chair, and five other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To the Stuart Low Co., Jarvis Brook, for a group of Orchids.

To Messrs. J. & A. McBean, Cooksbridge, for a group of Cymbidiums.

Award of Merit.

To *Odontoglossum* × 'Hale' ('*Telemachus*' × '*Theo*') (votes unanimous), from the Stuart Low Co., Jarvis Brook. See p. 309.

To *Cymbidium* × 'Granada' var. 'Sunrise' ('*Perdita*' × '*Ceres*') (votes unanimous), from Messrs. J. & A. McBean, Cooksbridge. See p. 309.

Cultural Commendation.

To the Stuart Low Co., Jarvis Brook, for a robust plant of *Oncidioda* × 'Stuart Low,' bearing a trailing spike of 45 flowers.

NARCISSUS AND TULIP COMMITTEE.—Mr. E. A. BOWLES, F.L.S., F.R.E.S., V.M.H., in the Chair, and eight other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Tulips.

Award of Merit.

To *Tulip* 'Trinita' as a variety for garden decoration and cutting (votes unanimous), from Sir Daniel Hall, Long Sutton House, Basingstoke. See p. 311.

Awards Recommended after Trial at Kirtton.

Award of Merit.

To *Narcissus* 'Marentha' as a variety for cutting from the open for market and for garden decoration. Sent by Messrs. Culpin Brothers, Spalding.

Plants to be seen again.

The Committee expressed a desire to see the following plants again : *Tulips* 'Themis,' 'Athos' and 'Redgauntlet,' shown by Sir Daniel Hall.

Other Exhibits.

Tulips 'Joseph's Coat' and 'Ann Pauline,' shown by Sir Daniel Hall.

Three collected forms of *Narcissus poeticus*, shown by C. F. Coleman, Esq., Broomhill, Hartley, Cranbrook.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and ten other members present.

Awards Recommended :—

First-class Certificate.

To *Rhododendron* × 'Fusilier' (*R. Elliottii* × *R. Griersonianum*) (votes 8 for, 0 against), from Lt.-Col. E. H. W. Bolitho, Trengwainton, Penzance. See p. 310.

To *Rhododendron* × 'Sunrise' (*R. Griersonianum* × *R. Griffithianum*) (votes 8 for, 0 against), from Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. 310.

Award of Merit.

To *Rhododendron* × 'Fire Flame' (*R. apodectum* × *decorum* × *R. Griersonianum*) (votes 8 for, 0 against), from Mr. C. R. Scrase-Dickins, Coolhurst, Horsham, Sussex. See p. 310.

To *Rhododendron* × 'Felicity' (*R.* × '*Radiance*' × *R.* × '*F. C. Puddle*') (votes 10 for, 0 against), from Lord Aberconway. See p. 310.

To *Rhododendron* × 'Siren' (*R.* × *Choremia* × *R. Griersonianum*) (votes 10 for, 0 against), from Lord Aberconway. See p. 310.

Selected for Trial at Wisley.

Asalea × 'Oriole' from Lord Aberconway.

Rhododendron 'Maid of Kent' (R. 'Alice' × R. × *Loderi*), from Messrs. R. Wallace & Co., The Old Gardens, Tunbridge Wells.

Asalea × ? (*A. mollis* × *A. sinensis*), from the Rt. Hon. Lord Swaythling, Townhill Park, West End, Southampton.

Other Exhibits.

R. × 'Phoebus' (R. × 'F. C. Puddle' × *R. haematodes*), R. × 'Eventide' (R. × 'Sunrise' × *R. Griersonianum*) and R. × 'Adonis' (R. × 'Vanessa' × R. × 'Sunrise'), shown by Lord Aberconway.

R. dendricola (K.W. 8016), *R. megacalyx* (K.W. 8205) and *R. inaequale*, shown by Lt.-Col. E. H. W. Bolitho.

R. Griersonianum × R. × 'G. A. Sims,' R. × 'White Pearl' × R. × *Loderi*, R. 'Britannia' × *R. Griersonianum*, shown by Lord Swaythling.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and nine other members present.

Awards Recommended :

Award of Merit.

To *Viola pedata bicolor alba* (votes 7 for, 0 against), as a plant for the alpine house, from W. Bentley, Esq., Quarry Wood, Burghclere, Newbury. See p. 311.

Preliminary Commendation.

To *Mertensia rivularis* var. *japonica* (votes 7 for, 0 against), from Mr. G. H. Berry, The Highlands, Ridgeway, Enfield.

To *Thalictrum latifolium* (votes 7 for, 0 against), from Dr. P. L. Giuseppi, Trevoise, Felixstowe.

To *Myosotis decora* (votes 7 for, 0 against), from Dr. A. Q. Wells, Shipton Manor, Kidlington, Oxon.

Other Exhibits.

Jankaea Heldreichii, *Cyathodes Colensoi*, *Passerina nivea*, *Helichrysum Doerfleri*, *Schizocodon soldanelloides alpina alba*, from Dr. P. L. Giuseppi.

Campanula rupestris, from Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, Kent.

Trillium grandiflorum 'Rose Queen,' from Mr. E. Ladhams, Elstead Nurseries, Surrey.

Lewisia, Millard's hybrids, from F. W. Millard, Esq., Camla, Felbridge, East Grinstead.

JUNE 16, 1942.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Fasciated inflorescences of Laburnum × Vossii seedling.—Mr. Grimes of Cardiff sent a branch of a seedling *Laburnum*, most of the inflorescences of which were fasciated, as they were over the whole tree. The branch came from the same tree as that from which the specimens shown on June 4, 1935, were taken and the peculiarity is evidently innate in this particular seedling and would probably be transmissible in grafts taken from it, as it is in the Stag's Horn Ash.

White Helleborine on Lawn.—Dr. Salaman reported that a lawn in his garden, hitherto closely cut, was this year allowed to remain uncut and several plants of *Cephalanthera grandiflora* came up and flowered upon it in a partially shaded part. It seems that in spite of the close cutting to which the foliage had been subject for some years the tubers must have survived and attained full size. His soil is a calcareous clay overlying chalk.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRET, V.M.H., in the Chair, and eleven other members present.

Exhibits.

A collection of vegetables, from Messrs. Allwood Bros., Haywards Heath, Sussex.

Strawberry 'Redbourn,' from Mr. G. Stanley Dunn, The Howe, Redbourn, Herts.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and eleven other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of herbaceous plants.

Silver Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations and *Dianthus Allwoodii*.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Pæonies.

Silver Banksian Medal.

To Messrs. T. Carlile, Ltd. (Loddon Nurseries), Twyford, for an exhibit of Lupines and other herbaceous plants.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

To Messrs. A. Perry, Enfield, for an exhibit of Irises and other herbaceous plants.

Banksian Medal.

To The Orpington Nurseries Co., Ltd., Orpington, for an exhibit of Irises.

Selected for Trial at Wisley.

Aster yunnanensis 'Napsbury,' from Mr. W. J. Jennings, Napsbury Hospital, St. Albans.

Erigeron 'Ernest Ladhams' } from Mr. E. Ladhams, Elstead Nurseries,

Erigeron 'Joyce Ladhams' } Godalming.

Other Exhibits.

Aster subcoeruleus 'Wendy,' from Messrs. T. Carlile, Ltd. (Loddon Nurseries), Twyford.

Roses, from Messrs. B. R. Cant & Sons, Ltd., Colchester.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and twenty other members present.

Awards Recommended :—*Silver-gilt Flora Medal.*

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of a rock garden and hardy herbaceous plants.

Silver-gilt Banksian Medal.

To Messrs. Constable, Ltd., Southborough, Kent, for an exhibit of Lilies and Eremuri.

Silver Flora Medal.

To Messrs. Hillier & Sons, Winchester, for an exhibit of flowering shrubs.

Silver Banksian Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, for an exhibit of flowering shrubs.

To the Stuart Low Co., Enfield, for an exhibit of flowering shrubs and greenhouse plants.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of flowering shrubs.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering shrubs.

First-class Certificate.

To *Styrax Hemsleyanum* as a hardy flowering shrub (votes 12 for, 1 against), from Colonel Stephenson R. Clarke, C.B., Borde Hill, Hayward's Heath, Sussex. See p. 311.

Award of Merit.

To *Richea scoparia* as a hardy flowering shrub (votes 12 for, 0 against), from Colonel Stephenson R. Clarke, C.B. See p. 311.

To *Spiraea trichocarpa* as a hardy flowering shrub (votes 14 for, 1 against), from Dame Alice Godman, D.B.E., South Lodge, Horsham, Sussex. See p. 311.

Other Exhibits.

Lonicera Tellmanniana, exhibited by the Stuart Low Co., Enfield.

Penstemon grandiflorus, exhibited by the Director, R.H.S. Gardens, Wisley.

Viburnum sp., exhibited by Collingwood Ingram, Esq., Benenden, Kent.

Hardy plants, exhibited by Mrs. K. Hopkinson, Coudon, Surrey.

ORCHID COMMITTEE.—Mr. GURNEY WILSON in the Chair, and nine other members present.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To The Stuart Low Co., Jarvis Brook, for a group of Orchids.

First-class Certificate.

To *Vanda lombohensis* var. 'Virginia Courtauld' (votes unanimous), from S. L. Courtauld, Esq., Eltham Hall, Eltham, S.E. 9. See p. 311.

Award of Merit.

To *Odontoglossum* × *Perryanum*, Sutherlands var. (votes unanimous), from Col. E. Middleton Perry, C.B.E., Sutherlands, Wimbledon. See p. 309.

To *Odontioda* × 'Janina' var. 'June' (votes 7 for, 1 against), from Messrs. Charlesworth & Co., Haywards Heath. See p. 309.

JOINT PERPETUAL-FLOWERING CARNATION COMMITTEE.—Mr. D. INGAMILLS in the Chair, and five other members present.

Exhibits.

'Peter Lord' (to be seen again), shown by Mr. S. Lord, Shenley Hospital, Shenley, Herts.

JOINT IRIS COMMITTEE.—Lady LAWRENCE in the Chair, and seven other members present.

Exhibits.

Iris siberica varieties, 'Whitethroat,' 'Tropic Night,' 'Caesar's Brother' and 'Souvenir,' all shown by Messrs. R. Wallace & Co., Tunbridge Wells.

The Awards to the Bearded Irises in the Wisley trials were confirmed.

JOINT RHODODENDRON COMMITTEE.—Mr. J. B. STEVENSON, V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Award of Merit.

To *Rhododendron* × 'Clotted Cream' (*R. auriculatum* × *R.* × 'Neda' (*R. dicroanthum* × Cunningham's Sulphur)) (votes 10 for, 0 against), from Lord Aberconway, Bodnant, Tal-y-Cafn, N. Wales. See p. 310.

To *Rhododendron* × 'Toreador' (*R.* × 'A. Osborn' × *R. Griersonianum*) (votes 10 for, 0 against), from Lord Aberconway. See p. 310.

To *Rhododendron* × 'Panoply' (*R.* × 'G. A. Sims' × *R. eriogynum*) (votes 8 for, 0 against), from Col. Stephenson R. Clarke, Borde Hill, Haywards Heath, Sussex. See p. 310.

Selected for Trial at Wisley.

Rhododendron 'Thunderbolt,' from Lady Martineau, Watermartins, Wentworth, Surrey.

Other Exhibits.

Rhododendron × 'Othello' (*R.* × 'A. Osborn' × *R. eriogynum*), *R.* × 'Radiance' (*R.* × 'Vanessa' × *R. Griersonianum*), *R.* × 'Eudora' (*R.* × 'Vanessa' × *R. facatum*) and *R.* × 'Thalia' (*R.* × 'Vanessa' × *R. eriogynum*), all from Lord Aberconway.

JOINT ROCK-GARDEN PLANT COMMITTEE.—There were no exhibits before the Committee on this occasion.

JUNE 26, 1942.

JOINT DELPHINIUM COMMITTEE.—Held at Wisley. Mr. D. CAMPBELL in the Chair, and eight other members present.

Awards Recommended :—

Award of Merit.

'Lorna Doone,' as an exhibition variety (votes 8 for, 0 against), shown by F. A. Bishop, Esq., The Glade, Clewer Green, Windsor. See p. 309.

'W. R. Chaplin,' as an exhibition variety (votes 8 for, 0 against), shown by Mr. W. R. Chaplin, Church Gate, Cheshunt. See p. 309.

Selected for trial at Wisley.

'Sue Murrell,' 'Ivy Ridgwell,' 'Lorna Doone,' 'Blue Lagoon,' and 'Kitty Patrick,' all shown by F. A. Bishop, Esq., Clewer Green, Windsor.

'W. R. Chaplin,' shown by Mr. W. R. Chaplin, Cheshunt.

'Royal Cambridge' and 'Harrovian,' shown by Mrs. Hugh Lang, Worplesdon Hill, Woking.

'Blue Dragon Fly,' shown by E. W. Mooring, Esq., Wormley, Witley, Surrey.

'Nita Yeates,' 'Marmeira,' 'Iris Yeates,' 'Shirley Venton,' 'Edith Yeates,'

'Gladdy,' 'Snow Queen,' 'Snow White,' 'Rutland,' 'Colwyn,' 'Blue Sky,'

'R. A. Yeates,' 'Navy,' 'Bubbly' and 'Blushing Bride,' all from Mr. R. A. Yeates, Ryeish Green Gardens, Spencers Wood, Reading.

Other Exhibits.

'Margaret Pratt,' from F. A. Bishop, Esq., Windsor.

'Pax,' from Mrs. Hugh Lang, Woking.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

JULY 6, 1942.

JOINT DELPHINIUM COMMITTEE.—Held at Wisley. Mr. T. HAY, V.M.H., in the Chair, and eight other members present.

Awards Recommended :—

Award of Merit.

To 'Audrey Mott' and 'George Bishop,' as exhibition varieties (votes 7 for, 0 against), shown by F. A. Bishop, Esq., The Glade, Clewer Green, Windsor. See p. 343.

Selected for trial at Wisley.

'Rhapsody,' shown by F. A. Bishop, Esq., Windsor.

JULY 7, 1942.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. J. FAIRLEE in the Chair, and six other members present.

Awards Recommended :—

First-class Certificate.

To 'Limpsfield White' and 'Hilda Moody,' as exhibition varieties (votes 6 for, 0 against, in each case), shown by R. Thain, Esq., Shalford, nr. Guildford. See p. 343.

Award of Merit.

'Sister Teresa' and 'Leslie Rennison,' as exhibition varieties (votes 6 for, 0 against, in each case), shown by R. Thain, Esq., Guildford. See p. 343.

JULY 14, 1942.

CLAY CUP COMPETITION.

The Clay Challenge Cup was awarded to Señor L. Pahissa, Rosas de Llobregat, Barcelona, Spain, for Rose 'Hispania.'

LILY COMPETITION FOR AMATEURS.

The Banksian Medal for the best new hybrid Lily was awarded to Colonel F. C. Stern, Highdown, Goring, for Lilium 'Frank Jones.'

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., F.R.E.S., V.M.H., in the Chair, and five other members present.

Virescent flowers of Ballota.—Mr. Palmer showed shoots of *Ballota pseudo-dictamnus* (a native of Crete) with the corolla of the same texture as and woolly like the calyx in all the flowers of the plant.

Tomatos deficient in Magnesia.—Professor R. H. Stoughton showed foliage of Tomatos with yellow patches covering much of the leaf, symptomatic of deficiency of magnesium, a condition to be avoided by dressings of magnesian limestone. He also showed photographs of :

Tomatos grown by the aid of water solutions in gravel, the solutions being supplied automatically at intervals and containing superphosphate, sodium nitrate or calcium nitrate, potassium sulphate and magnesium sulphate. This example of "soilless culture" showed plants growing and fruiting as well as they do under the best cultivation in soil.

Castanopsis chrysophylla obovata.—Shoots of this curious dwarf form of *Castanopsis chrysophylla* with roundish blunt leaves scarcely an inch long were shown, having been before Floral Committee B. The form was raised by Messrs. T. Smith of Newry about 1914 from seed obtained from N. America.

FRUIT AND VEGETABLE COMMITTEE.—Mr. F. A. SECRETT, V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Silver-gilt Knightian Medal.

To British Flower Marketing Association, 23 Russell Chambers, Covent Garden, W.C. 2, for collection of vegetables.

Other Exhibits.

Multi-podded Pea, from The Horticultural Research Station, University of Cambridge.

Seedling Cherry, from Mr. C. Howlett, The Yews, Earley, Reading.

Seedling Cherry, from Mr. A. F. Quittenden, 62 Devonshire Way, Shirley, Croydon.

Seedling Cherry, from Mr. H. Wyles, Northamptonshire Institute of Agriculture, Moulton, nr. Northampton.

Strawberry 'Redbourn,' from Mr. G. Stanley Dunn, The Hame, Redbourn, Herts.

FLORAL COMMITTEE A.—Mr. D. INGAMILLS in the Chair, and eight other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Border Carnations and *Dianthus Allwoodii*.

To Messrs. R. H. Bath, Ltd., Wisbech, for an exhibit of Paeonies and Lilies.

To Messrs. Robert Bolton & Son, Birdbrook, for an exhibit of Sweet Peas.

Silver Flora Medal.

To Messrs. Frank Cant & Co., Colchester, for an exhibit of Roses.

To W. G. Ferris, Esq., East Horsley, for an exhibit of Border Carnations.

Silver Banksian Medal.

To Messrs. Thomas Carlile (Loddon Nurseries) Ltd., Twyford, for an exhibit of herbaceous plants.

To Mr. Amos Perry, Enfield, for an exhibit of *Hemerocallis* hybrids.

To Messrs. D. Stewart & Son, Ltd., Ferndown, for an exhibit of herbaceous plants.

Flora Medal.

To Messrs. Alex. Dickson & Sons, Newtownards, for an exhibit of Roses.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations and Lilies.

To Knap Hill Nursery Ltd., Woking, for an exhibit of new *Iris Kaempferi*.

Banksian Medal.

To Messrs. B. R. Cant & Sons, Ltd., Colchester, for an exhibit of Roses.

To R. Thain, Esq., Shalford, for an exhibit of Border Carnations.

Other Exhibits.

Erigeron 'Ernest Ladhams,' from Mr. E. Ladhams, Elstead Nurseries, Godalming.

Rose 'Alamein,' from Messrs. A. A. Buckwell & Sons, St. Mary Cray, Kent.

Sweet Peas, from Messrs. Dobbie & Co., Ltd., Edinburgh.

Sweet Peas (Non-tendrill), from Messrs. E. W. King & Co., Ltd., Coggeshall.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and seventeen other members present.

Awards Recommended :—

Gold Medal.

To Messrs. R. Wallace & Co., Tunbridge Wells, for an exhibit of Lilies, Eremuri and other hardy plants.

Silver-gilt Flora Medal.

To Messrs. Constable, Ltd., Southborough, Kent, for an exhibit of Lilies, Eremuri and other hardy plants.

Silver-gilt Banksian Medal.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of rock garden and border plants.

Banksian Medal.

To Messrs. K. Hopkinson, Coulsdon, Surrey, for an exhibit of rock garden and border plants.

Award of Merit.

To *Lilium* × *Manglesii* 'Danesmere Variety,' as a hardy flowering plant (votes 8 for, 3 against), from J. E. H. Stooke, Esq., Danesmere, Hereford. See p. 343.

To *Scirpus Tabernaemontani albescens* as a hardy ornamental-foliaged aquatic plant (votes 9 for, 1 against), from Mr. Amos Perry, Enfield. See p. 344.

To *Viburnum tomentosum* 'Rowallane Variety,' as a hardy flowering shrub (votes 12 for, 2 against), from Collingwood Ingram, Esq., The Grange, Benenden, Kent. This award was recommended, subject to verification of name, on June 16, 1942, and is now confirmed. See p. 344.

Cultural Commendation.

To Mr. W. Fleming, gardener to Col. Stephenson R. Clarke, C.B., Borde Hill, Haywards Heath, Sussex, for an exhibit of *Notospartium Carmichaeliae*.

Other Exhibits.

Caesalpinia pulcherrima, *Solanum Wendlandii*, exhibited by W. J. Kaye, Esq., Guildford.

Castanopsis obtusatum, *Meliosma myriantha*, exhibited by Lord Aberconway, Bodnant.

Lilium canadense forma, exhibited by Dr. M. Amsler, Hawkhurst.

Lilium 'Lemon King,' exhibited by J. E. H. Stooke, Esq., Hereford.

Lilium pardalinum hybrid, exhibited by the Rt. Hon. Lord Swaythling, Southampton.

Rosa Helenae 'White Cloud,' exhibited by C. Ingram, Esq., Benenden, Kent.

Spigelia marilandica, exhibited by Mr. Amos Perry, Enfield.

Flowering shrubs, exhibited by Messrs. Burkwood & Skipwith, Ltd., Kingston, and Messrs. L. R. Russell, Ltd., Windlesham, Surrey.

ORCHID COMMITTEE.—Mr. GURNEY WILSON in the Chair, and six other members present.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To Messrs. Charlesworth & Co., Haywards Heath, for a group of Orchids.

To Messrs. The Stuart Low Co., Jarvis Brook, for a group of Orchids.

Award of Merit.

To *Vuykstekeara* × 'Cuesta' (*Vuykstekeara* 'Cambria' × *Odontoglossum* 'Purple Queen') (votes unanimous), from Messrs. Charlesworth & Co., Haywards Heath. See p. 344.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Mr. J. FAIRLIE in the Chair, and eight other members present.

Awards Recommended :—*Award of Merit.*

'Patrick,' for exhibition (votes 7 for, 0 against), shown by W. G. Ferris, Esq., East Horsley. See p. 343.

'Farmer Butler,' for exhibition (votes 6 for, 0 against), shown by R. Thain, Esq., Shalford, Guildford. See p. 343.

Other Exhibits.

'Sybil Gladys,' shown by H. Layzell, Esq., Market Hill, Maldon, Essex.

'Seedling,' shown by C. W. Barnes, Esq., Stratford Road, Southall, Middx.

JOINT ROCK-GARDEN PLANT COMMITTEE.—There were no plants before the Committee on this occasion.

LILY COMMITTEE.—Mr. C. H. CURTIS, F.L.S., V.M.H., in the Chair, and ten other members present.

The Lyttel Lily Cup.

It was unanimously recommended that the Lyttel Lily Cup, which is awarded annually to someone who has done good work in connexion with *Lilium*, *Nomocharis* or *Fritillaria*, be awarded for 1942 to Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea, for the great interest in Lilies which he has aroused in the capacity of Chairman of the Lily Committee and the Lily Group.

JULY 20, 1942.

JOINT BORDER CARNATION AND PICOTEE COMMITTEE.—Held at Wisley. Mr. E. CHARRINGTON in the Chair, and seven other members present.

Awards Recommended :—

Award of Merit.

'Cameo,' for exhibition, votes 6 for, 0 against, shown by R. Thain, Esq., Thatch Lossum, Shalford, nr. Guildford. See p. 343.

Other Exhibits.

'Southern Breeze,' shown by F. J. Hayward, Esq., Mill Road, Maldon, Essex.

THE NAMING OF GARDEN PLANTS.

PLANTS raised in gardens as seedlings or sports of species or as hybrids between species often have to be named by non-botanical people, and the following rules, agreed to at the International Horticultural Conferences of London and Paris, are for their guidance.

- (a) The name of a horticultural variety should be placed after that of the species to which it belongs, and its status should, or may, be indicated by the contraction " var." Examples are given below.
- (b) The varietal name should be of Latin form only when it expresses some character of the plant, e.g. *nanus*, *fastigiatus*, *albus*, or its place of origin, e.g. *kewensis*.

The use of Latin proper names for horticultural varieties is not permissible, e.g. *Iris pallida Smithii* would be an inadmissible name for a garden variety.

- (c) The name will thus usually be a " fancy " name, beginning with a capital letter, e.g. *Galega officinalis* var. 'George Hartland,' not *Galega officinalis* var. *Hartlandii*; *Dianthus deltoides* var. 'Brilliant,' not *Dianthus deltoides* var. *brilliantissimus*; Pea 'Masterpiece.'
- (d) Varietal names must not be translated when transferred from other languages, but must be preserved in the language in which they were originally described.

Where desirable a translation may be placed in brackets after the varietal name.

- (e) As far as possible names of horticultural varieties should consist of a single word; the employment of not more than three words is permitted as a maximum.

- (1) A varietal name in use for one variety of a kind of plant should not be used again for another variety of that kind, even though it may be attached to a different species.

That is, the use of the name *Narcissus Pseudonarcissus* 'Victoria' should preclude the use of 'Victoria' as a varietal name for any other species of *Narcissus*, such as *Narcissus poeticus* 'Victoria.' Similarly, there should be but one *Iris* 'Bridesmaid,' one Plum 'Superb,' and so on.

- (2) Varietal names likely to be confused with one another should be avoided. For instance, the use of the name 'Alexander' should preclude the use of 'Alexandra,' 'Alexandria,' and 'Alexandrina' as varietal names for the same kind of plant.
- (3) Where personal names are used to designate varieties, the prefixes " Mr.," " Mrs.," " Miss," and their equivalents should be avoided.
- (4) Excessively long words and words difficult to pronounce should be avoided in coining varietal names.
- (5) The articles " a " and " the " and their equivalents should be avoided in all languages when they do not form an integral part of a substantive, e.g. 'Colonel,' not 'The Colonel'; 'Giant,' not 'The Giant'; 'Bride,' not 'The Bride.'
- (6) Existing names in common use should not be altered to conform to these rules, but attention should be paid to them in all new names proposed.

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETINGS.

SEPTEMBER 15, 1942.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.L.S., V.M.H., in the Chair, and six other members present.

Ballota pseudodictamnus.—Mr. Palmer reported that the plant which had hitherto produced virescent flowers both this year and last had now produced a few normal flowers.

Hibiscus Trionum adventive.—Mr. A. B. Jackson reported that *Hibiscus Trionum* had occurred as a wild plant at Middlesbrough. It is a widely distributed native of the tropics well worth the place it occasionally occupies in British gardens.

Iris Kaempferi sporting?—Mrs. Maidment of Christchurch sent flowers of the "double" form of *I. Kaempferi*, writing that blue-flowered plants had been planted in two baskets about 12 years ago, had not been replanted and had flowered, producing blue flowers annually until the present year. Now one basket had produced a dozen white flowers. She enquired whether *I. Kaempferi* was known to "turn white." The particulars given did not preclude the possibility of a seedling having grown up in the basket, nor of sporting having occurred.

Abundance of wasps.—Mr. G. Fox Wilson commented upon the remarkable abundance of wasps during the present season and showed a chart demonstrating the prevalence to equal that of 1928, when they were much more abundant than in any other season of which he had records. He had not found a common factor to account for these two swarms but suggested that the abundance of aphides and caterpillars upon which the queen wasps feed in the spring might provide an explanation this year.

Onion × Leek?—Mr. Sehenn reported that the seeds of the plant which he thought last autumn to be a possible hybrid between Onion and Leek (see R.H.S. JOURNAL, 67, p. xxxiii) had produced plants which at first resembled Onions but which when 6 or 8 inches high had "developed as the Leek does." The plants had developed rather irregularly and many seemed to be tardy in growth. Mr. Sehenn promised further report later.

Colchicum atropurpureum.—Mr. Bowles showed flowers in various stages from the bud to the developed flower of a plant of *Colchicum atropurpureum* grown at Wisley. The young flower including the tube was white, a later one pink, and the fully grown one deep purple, confirming the excellent description given by Parkinson in his *Paradisus*, a description which had been called in question by Dr. Stapf in the Botanical Magazine, t. 8876, where also the bud had been wrongly figured as full deep purple like the mature flower.

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. CHEAL in the Chair, and ten other members present.

Awards Recommended:—

Silver Knightian Medal.

To The Royal Air Force (Unit Gardens), Air Ministry, Woburn Place, London, W.C. 1, for collection of Fruit and Vegetables.

Recommended for Trial at Wisley.

Tomato 'Blood Orange,' from Mr. F. Herbert Chapman, West Mead, Peasmarsh, Rye, Sussex.

Other Exhibits.

Collection of vegetables, from Messrs. Allwood Bros., Haywards Heath.

Collection of vegetables, from The Director, R.H.S. Gardens, Wisley.

Apple 'Thomas Edmeads,' from Mrs. E. L. Cheesman, Bleak House, New Holland, Barrow-on-Humber, Lincs.

Apple 'Emma Pole,' from Mr. H. T. Barnett, Westwood House, Tilehurst, Berks.

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Apple 'John Gibbons,' from Mr. J. J. Gibbons, Southleigh Nurseries, Locks-
heath, Southampton.

Apple 'Elma,' from Mr. J. Walker, The Farm, Ham Common, Richmond.

Apples 'Laxton's Fortune' and 'Gravenstein,' from R.H.S. Commercial
Fruit Trials.

Peach 'Suncroft,' from Mrs. W. S. Howells, Suncroft, 194, Kew Road, Rich-
mond, Surrey.

Gages 'Clivemeare Golden Gage' and 'Clivemeare Crimson Gage,' from
Mr. Clive H. Meares, Links Cottage, Sunningdale.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and six
other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

To Messrs. Barr & Sons, Taplow, for an exhibit of herbaceous plants.

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver Banksian Medal.

To Messrs. J. Cheal & Sons, Crawley, for an exhibit of Dahlias.

Flora Medal.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

To Messrs. K. Luxford & Co., Sawbridgeworth, for an exhibit of Chrysanthemums.

To Mr. H. Woolman, Shirley, Birmingham, for an exhibit of Chrysanthemums.

Banksian Medal.

To Messrs. B. R. Cant & Sons, Ltd., Colchester, for an exhibit of Roses.

To Messrs. T. Carlile, Ltd., Twyford, for an exhibit of herbaceous plants.

Selected for Trial at Wisley.

Fuchsia Seedlings Nos. 1 and 2 from C. J. Howlett, Esq., Earley, Reading.

Other Exhibits.

Phlox decussata 'High Sheriff Wastie,' from J. F. Wastie, Esq., Eynsham, Oxford.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and nineteen other members present.

Awards Recommended :—

Silver Flora Medal.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of herbaceous and rock garden plants.

To Messrs. D. Stewart & Son, Ltd., Ferndown, Dorset, for an exhibit of herbaceous plants and shrubs.

Flora Medal.

To Messrs. J. Cheal & Sons, Ltd., Crawley, Sussex, for an exhibit of flowering and foliage shrubs.

To Mr. Amos Perry, Enfield, for an exhibit of herbaceous plants.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of flowering and foliage shrubs.

Award of Merit.

To *Eriogonum Alleni* as a flowering plant suitable for the rock garden (votes 12 for, 5 against), from the Director, Royal Botanic Gardens, Kew. See p. 402.

Preliminary Commendation.

To *Photinia glomerata* as a hardy evergreen shrub (votes unanimous), from Lord Aberconway, C.B.E., V.M.H., Bodnant, N. Wales.

Other Exhibits.

Buddleia × *Hotblackiana* (*B. Forrestii* × *B. Davidii Veitchiana*), exhibited by H. S. Hotblack, Esq., Cuckfield, Sussex.

Collection of Fuchsias exhibited by the Hon. Lewis Palmer, Sutton Scotney, Hants.

Lilium myriophyllum superbum, exhibited by Lord Aberconway.

Herbaceous plants, exhibited by Mrs. K. Hopkinson, Coulsdon, Surrey.

Rhododendron 'Glow-worm,' exhibited by Lord Aberconway.

ORCHID COMMITTEE.—Mr. GURNEY WILSON, F.L.S., in the Chair, and eight other members present.

Awards Recommended :—

Award of Merit.

To *Laeliocattleya* × 'Gwinevere,' Westonbirt var. (Lc. 'Queen Mary' × Lc. 'Gretal') (votes unanimous), from Messrs. H. G. Alexander, Ltd., Tetbury, Glos. See p. 403.

To *Laeliocattleya* × 'Derna' var. 'Golden Lady' (C. *Dowiana aurea* × Lc. 'Nugget') (votes unanimous), from Messrs. Black & Flory, Slough. See p. 403.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. D. INGAMILLS in the Chair, and seven other members present.

Awards Recommended :—

Award of Merit.

'August Pink,' as a market variety, votes 6 for, 0 against, shown by Messrs. A. G. Vinten, Ltd., Oldlands Nurseries, Balcombe, Sussex. See p. 402.

Selected for Trial at Wisley.

'August Pink,' shown by Messrs. A. G. Vinten, Ltd., Balcombe, Sussex.

'Cream Youth,' shown by Messrs. H. G. Park, The Gas Works, Stanmore, Middx.

Other Exhibits.

'Commando' and 'Champola,' shown by Mr. H. Lowe, Vicar Lane Nurseries, Tibshelf, Derbys.

JOINT DAHLIA COMMITTEE.—Mr. T. HAY, V.M.H., C.V.O., in the Chair, and nine other members present.

Dahlias Selected for Trial at Wisley.

'Barcroft,' 'Pinkie,' 'Pink Star,' 'Red Ally,' 'Stoodley,' from Mr. J. F. Barwise, Towneley Nurseries, Burnley.

'Catalina,' 'Conway,' 'Cree,' 'Derwent,' 'Tamar,' 'Trent,' from Messrs. Brown & Such, Ltd., Royal Berkshire Nurseries, Maidenhead.

'Bright Eye,' 'Coral Island,' 'Quicksilver,' 'White Chief,' from Messrs. J. Stredwick & Son, Silverhill Park, St. Leonards.

Dahlias were also submitted by O. Parratt, Esq., Farnham; G. P. Roddam, Esq., Weybridge; Messrs. J. F. Spencer & Son, Hockley; A. F. Tofield, Esq., Worthing; Messrs. W. Treseder, Ltd., Cardiff; P. Walser, Esq., London; G. B. Williams, Esq., Crowthorne; F. C. Windibank, Esq., Liphook.

SEPTEMBER 29, 1942.

JOINT EARLY-FLOWERING CHRYSANTHEMUM COMMITTEE.—Mr. D. INGAMILLS in the Chair, and ten other members present.

Awards Recommended :—

Award of Merit.

'Mosquito,' as an exhibition variety (votes 6 for, 2 against); and 'Hurricane,' as an exhibition variety (votes 10 for, 0 against), both shown by Mr. H. Shoesmith, Mayford, Woking. See p. 402.

'Lovelace,' as an exhibition and market variety (votes 9 for, 1 against); and 'Serenus,' as an exhibition variety (votes 10 for, 0 against), both shown by Messrs. J. & T. Johnson, Tibshelf, Derbys. See p. 402.

Selected for trial at Wisley.

'Jeannie,' 'Chaffinch,' 'Mosquito,' 'Hurricane' and 'Yellow Boquet,' all shown by Mr. H. Shoesmith, Mayford, Woking.

'Heather,' shown by Mr. H. G. Parks, Stanmore, Middx.

'Lovelace,' and 'Serenus,' shown by Messrs. J. & T. Johnson, Tibshelf, Derbys.

Other Exhibits.

'Constancy,' 'Alaric,' 'Celia,' 'Firedrake,' 'Cordelia,' and 'Lidice,' all shown by Messrs. J. & T. Johnson, Tibshelf, Derbys.

OCTOBER 6-7, 1942.

FRUIT AND VEGETABLE SHOW.

Chief Awards in the Competitive Classes.

The Gordon Lennox Challenge Cup, for the most meritorious display of fruit staged by an amateur.

To Sir Gerald F. Boles, Bishops Lydeard. (Gdnr. Mr. H. R. Tuffin.)

The Society's Vegetable Challenge Cup, for the highest number of points gained in the competitive classes for vegetables.

To Mrs. M. Hansard, Little Bookham. (Gdnr. Mr. J. Wynn.)

The Affiliated Societies Challenge Cup, for the best exhibit of 18 dishes of Apples and Pears, staged by an Affiliated Society.

To the Reading & District Gardeners Mutual Improvement Assoc., Reading.

The Sutton Cup, for the best exhibit of 12 kinds of vegetables staged by an Amateur.

To Mrs. M. Hansard, Little Bookham.

The Riddell Trophy, for the best exhibit of 6 kinds of vegetables staged by an Amateur.

To the Queen Anne's School, Caversham, nr. Reading.

Silver Trophy, for a Table of Vegetables staged by a Municipal Authority.

To the Stamford Park Joint Committee, Stalybridge, Cheshire.

Silver Cup, for a Table of Vegetables staged by a Municipal Authority.

To the County Borough of Bolton, Parks & Cemeteries Dept., Bolton.

OCTOBER 6, 1942.

SCIENTIFIC COMMITTEE.—Mr. E. A. BOWLES, M.A., F.R.E.S., F.L.S., V.M.H., in the Chair, and six other members present. Lady Beatrix Stanley and Mr. R. D. Trotter as visitors.

Colchicum sp.—A small-flowered *Colchicum* was shown by Mr. Trotter, raised from seed collected by Mr. E. K. Balls and sent home by him under No. 402. This had been identified tentatively from leaves as *C. umbrosum*, but the flowers were smaller than the descriptions of that species suggest, the perianth segments being not above $\frac{1}{2}$ inch long, whereas in *C. umbrosum* they are said to be $1\frac{1}{4}$ inch in length.

Seedling Roses.—Mr. R. D. Trotter also showed fruiting sprays of two seedling Roses probably raised from *R. holodonta* with a general likeness to the group to which that species belongs but distinct from it. Roses of this section, like those of the Caninae group so common in England, appear to vary very much when raised from seed. The most marked forms are distinct enough, but many intermediates occur as well as colour variants.

Phlomis sp.—A species of *Phlomis* with heads of rather small orange flowers was shown by Capt. Edmund de Rothschild of Exbury, raised from seed collected by Capt. Kingdon Ward under No. 14090, apparently so far unnamed.

Form of Erica cinerea.—Mr. Murray Hornibrook sent shoots of a curious form of *Erica cinerea* found by him near Mousehole, Cornwall, in which the place of the flowers was occupied by numerous leaf-like structures closely packed and tinged purplish-red. Dr. Barnes has examined the specimens and reports that each of the tufts of leaves is terminal at the end of what seems to be an unaltered pedicel and the abnormality seems to be confined to the flower, no other part of the inflorescence being affected. He found it difficult to make a confident statement on the nature of the abnormality, but thought there was no doubt that many if not all the foliar members making up the individual tufts were bracts which have acquired something of the characters of an ordinary leaf; they were arranged spirally, not in whorls. He thought the case might be parallel to the greening which is not uncommon in *Trifolium repens* (so far as he knew still unexplained) and with odd conditions he had seen in *Stellaria media* and *Anagallis arvensis*, which he believed also he had been able to induce.

Similar specimens of *Erica cinerea* were shown to the Committee in 1930, collected in Dorsetshire by Mr. John Fraser, and Mr. Hanbury then reported that he had seen the same phenomenon in *E. vagans* in Cornwall.

FRUIT AND VEGETABLE COMMITTEE.—Mr. A. CHEAL in the Chair, and twenty-four other members present.

Awards Recommended:—

Gold Medal.

To Bolton Corporation (Parks Department), Heaton Cemetery, Bolton, for collection of Vegetables (votes 17 for, 0 against).

To Messrs. Suttons, Reading, for collection of Vegetables (votes 14 for, 0 against).

Silver Knightian Medal.

To County Borough of Newport (Mon.) Parks and Allotments Department, for collection of Vegetables.

To Military Gardens in London District, for collection of Vegetables.

Bronze Knightian Medal.

To Ilford Borough Council, Ilford, for collection of Vegetables.

To Mr. W. Watkins, Newsells Gardens, Royston, Herts., for collection of Vegetables.

Silver Gilt Hogg Medal.

To Messrs. Cheal, Lowfield Nurseries, Crawley, for collection of Fruit.

Silver Hogg Medal.

To Mr. W. Watkins, Newsells Nurseries, Royston, Herts, for collection of Fruit.

Recommended for trial at Wisley.

Seedling Peach, from Mr. V. M. Falkner, 63, Elmfield Avenue, Teddington, Middx.

Other Exhibits.

Collection of Apples, from Mr. B. Crewdson, Red Lane Farm, Limpsfield.

Collection of seedling Pears, from The Director, John Innes Horticultural Institution, Merton.

Collection of Potatos, from The Director, R.H.S. Gardens, Wisley.

Collection of Onions, from Mr. H. W. Mitton, Fidra, Mellor Brook Road, nr. Blackburn.

Collection of Apples, from the R.H.S. Commercial Fruit Trials, Wisley.

Apple 'Maid of Kent,' from Mr. H. Parsons, Pelsham Gardens, Peasmarsh, Sussex.

Apples 'Oxford Sunrise' and 'Oxford Yeoman,' from Lieut. J. F. Wastie, Eynsham, nr. Oxford.

FLORAL COMMITTEE A.—Mr. G. W. LEAK, V.M.H., in the Chair, and nine other members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. J. Cheal and Sons, Ltd., Crawley, for an exhibit of Dahlias.

To Messrs. A. G. Vinten, Ltd., Balcombe, for an exhibit of Chrysanthemums.

Silver Banksian Medal.

To Messrs. Allwood Bros., Haywards Heath, for an exhibit of Carnations.

Flora Medal.

To Messrs. C. Engelmann, Ltd., Saffron Walden, for an exhibit of Carnations.

To Mr. Amos Perry, Enfield, for an exhibit of herbaceous plants.

Banksian Medal.

To Messrs. Thomas Carlile (Lodden Nurseries), Ltd., Twyford, for an exhibit of herbaceous plants.

Award of Merit.

To *Nerine* 'Dunkirk,' as a cool greenhouse plant (votes 9 for, 0 against), from Captain Edmund de Rothschild, Exbury, Southampton. See p. 403.

To *Nerine* 'Edith Amy,' as a cool greenhouse plant (votes 9 for, 0 against), from Captain Edmund de Rothschild. See p. 403.

To *Nerine* 'Herga,' as a cool greenhouse plant (votes 9 for, 0 against), from Captain Edmund de Rothschild. See p. 403.

Other Exhibits.

Aster novi-belgii 'Mauveen' and *Aster novi-belgii* 'Oxford,' both from A. T. Barnes, Esq., Bedford.

Chrysanthemum 'Mrs. Thomas Dowding,' from T. Dowding, Esq., Redditch.

Colchicum speciosum 'Purity,' from C. Scrase Dickins, Esq., Horsham.

FLORAL COMMITTEE B.—Lord ABERCONWAY, C.B.E., V.M.H., in the Chair, and fifteen other members present.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. E. Ladhams, Elstead, Surrey, for an exhibit of rock garden plants and shrubs.

liv PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

To Messrs. L. R. Russell, Ltd., Windlesham, Surrey, for an exhibit of ornamental-foliaged shrubs.

Banksian Medal.

To Messrs. Burkwood & Skipwith, Ltd., Kingston-on-Thames, for an exhibit of ornamental-foliaged shrubs.

Award of Merit.

To *Cotoneaster glabrata* as a hardy, ornamental-fruited shrub (votes unanimous), from the Director, Royal Botanic Gardens, Kew. See p. 402.

To *Protea cynaroides* as an evergreen, flowering shrub for the greenhouse (votes unanimous), from Colonel Stephenson R. Clarke, C.B., Borde Hill, Hayward's Heath. See p. 403.

Other Exhibits.

Berberis sp. F. 19521, *Phlomis* sp. K.W. 14090, exhibited by Capt. Edmund de Rothschild, Exbury, Southampton.

Berberis × *highdownensis*, *Cotoneaster conspicua*, *Crataegus Ellwangeriana*, exhibited by Colonel F. C. Stern, O.B.E., M.C., Goring-by-Sea.

Kniphofia multiflora alba, exhibited by Mr. Amos Perry, Enfield.

Malus crataegifolia, exhibited by the Director, John Innes Horticultural Institution, Merton Park, S.W. 19.

Pyracantha Rogersiana flava, exhibited by Collingwood Ingram, Esq., Benenden.

Rosa holodonta seedlings, exhibited by R. D. Trotter, Esq., Ockley.

Sorbus munda var. *subaracknoidea*, exhibited by Colonel Stephenson R. Clarke, C.B., Hayward's Heath.

Shrubs and hardy plants, exhibited by Mrs. K. Hopkinson, Coulsdon.

ORCHID COMMITTEE.—Mr. GURNEY WILSON in the Chair, and seven other members present.

Awards Recommended :—

First-class Certificate.

To *Cypripedium* × 'Snow-Bunting' ('Florence Spencer' × 'F. C. Puddle'), (votes unanimous), from the Rt. Hon. Lord Aberconway, C.B.E., Bodnant, Tal-y-Cafn, N. Wales. See p. 402.

Award of Merit.

To *Laeliocattleya* × 'Honiton' (C. 'Mrs. Frederick Knollys' × Lc. 'Crowborough') (votes 6 for, 0 against), from The Stuart Low Co., Jarvis Brook, Sussex. See p. 403.

Silver-gilt Banksian Medal.

To The Stuart Low Co., Jarvis Brook, Sussex, for a group of Orchids.

JOINT DAHLIA COMMITTEE.—Mr. T. HAY, V.M.H., C.V.O., in the Chair, and five other members present.

Selected for trial at Wisley.

'Scarlet Glory,' from Mr. A. T. Barnes, 13 Cardington Road, Bedford.

'B XXIII,' 'Mrs. S. J. Spencer,' from Messrs. J. F. Spencer and Sons, Hockley.

'Ardent,' 'Corvette,' 'Enoch Potts,' 'Mohawk,' from Messrs. J. Stredwick and Son, Silverhill Park, St. Leonards-on-Sea.

Dahlias were also submitted by Mr. P. Henson, Forest Town, Notts.

JOINT ROCK-GARDEN PLANT COMMITTEE.—Colonel F. C. STERN, O.B.E., M.C., F.L.S., V.M.H., in the Chair, and six other members present.

Award Recommended :—

Cultural Commendation.

To Mrs. C. B. Saunders, Husseys, Green St. Green, Farnborough, for *Gentiana pyrenaica*.

Other Exhibits.

Microcachrys tetragona, from Dr. P. L. Giuseppi, Felixstowe; it was recommended that this plant be sent to the Scientific Committee.

Gentiana Kochiana alba, from Gilbert White, Esq., Chinthurst, Kingston Hill.

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